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TWENTY-SEVENTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

STATE HORTICULTURAL SOCIETY

OF

MICHIGAN

1897

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REPORT OF THE SECRETARY

OF THE

MICHIGAN STATE HORTICULTURAL SOCIETY

ALLEGAN, MICHIGAN,
December, 1897.

TO HON. HAZEN S. PINGREE, *Governor of the State of Michigan:*

I have the honor to submit herewith, in compliance with legal requirement, the accompanying report of 1896, with supplementary papers.

Respectfully yours,

EDWY C. REID,

Secretary of the Michigan State Horticultural Society.

OFFICERS OF THE STATE HORTICULTURAL SOCIETY FOR 1898.

President—ROLAND MORRILL, Benton Harbor.
Honorary President—T. T. LYON, South Haven.
Vice-President—C. J. MONROE, South Haven.
Secretary—EDWY C. REID, Allegan.
Treasurer—ASA W. SLAYTON, Grand Rapids.
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R. M. KELLOGG, Three Rivers, 1 year.
L. R. TAFT, Agricultural College, 1 year.
C. J. MUNROE, South Haven, 2 years.
W. W. TRACY, Detroit, 2 years.
R. D. GRAHAM, Grand Rapids, 3 years.
CHAS. F. HALE, Shelby, 3 years.

STANDING COMMITTEES.

On Fruit Catalogue—L. R. TAFT, Agricultural College, Chairman; T. T. LYON, South Haven; A. A. CROZIER, Agricultural College; W. A. SMITH, Benton Harbor; C. A. SESSIONS, Grand Rapids.

On New Fruits—T. T. LYON, South Haven, Chairman; C. A. SESSIONS, Grand Rapids; S. R. FULLER, Eaton Rapids; C. ENGEL, Paw Paw.

On Finance—C. J. MUNROE, C. W. GARFIELD.

On Entomology—G. C. DAVIS, Chairman.

On Vegetable Physiology—L. R. TAFT, Chairman.

On Landscape Gardening—E. FERRAND, Chairman.

On Vegetable Gardening—W. W. TRACY, Chairman.

On Forestry—C. W. GARFIELD, Chairman, Grand Rapids; L. R. TAFT, Agricultural College; C. A. SESSIONS, Grand Rapids.

PROCEEDINGS OF THE SUMMER MEETING.

HELD AT GRAND HAVEN, JUNE 24 AND 25, 1897.

The summer meeting of the society was held in Grand Haven, June 24 and 25. Like all meetings of fruitgrowers held at busy seasons of the year, the attendance was not so great as it should have been, although it was considerable both in numbers and quality. The sessions began Thursday morning and closed Friday afternoon. Several events of a social and public character, dates for which were made subsequent to arrangements for this meeting, conspired to prevent the attendance of many people who otherwise would have been present. Still, the vicinities Grand Haven and Spring Lake were well represented, and there was almost the usual attendance of prominent horticulturists from about the state.

President Morrill was not in attendance the first day, therefore, Vice-President Monroe was in conduct of most of the sessions. Mayor Goodrich of Grand Haven made a singularly apt address of welcome, to which Mr. Monroe responded.

The plan to provide for a display of strawberries for premiums offered by the society was highly successful, the exhibit embracing almost one hundred boxes, nearly all of the very finest and largest fruit. This was true of all the competitive entries. The Agricultural college placed on exhibition sixteen varieties, mostly new and unknown kinds, which were described by Prof. Taft in his talk upon "Promising new strawberries". It is doubtful if this display was ever exceeded by anything of the kind in Michigan at least. Most of the varieties shown are referred to in the report of the committee on exhibits, so that rehearsal of them here is unnecessary.

The pleasure of the meeting was greatly increased by the generous display of carnations made by Mr. J. G. Hancock of Grand Haven, who is very largely engaged in their production, and who is widely known as the originator of several of the new varieties of this popular flower. Mr. Hancock also embellished the room with a number of other plants and flowers, while the Agricultural college contributed a large and handsome bunch of May gladiolus. The papers and discussions ran very largely upon small-fruit topics, as was natural considering the fact that the horticulture of Grand Haven chiefly consists of small fruit.

A very pleasant episode was that in connection with President Lyon. The beloved patriarch of the society sent greetings by Vice-President Monroe, expressing his continued interest and faith in the society and its work. Upon motion of Mr. G. W. Barnett of Chicago, the society by unanimous rising vote acknowledged receipt of Mr. Lyon's greeting and made cordial and sincere return of the same.

There was considerable discussion over the plan of federal inspection and control of the produce commission business, proposed by the society at Grand Haven. A motion for indorsement of the plan by the state society resulted in reference of the whole matter to the legislative committee, to be reported upon at the next annual meeting in December.

We append the reports of the committees on exhibits and resolutions:

EXHIBITS.

We find entered in competition for the premiums offered by the society a large number of plates of strawberries, and recommend the following awards:

For the box of largest strawberries, first, $1, to Frank M. Deremo of Spring Lake, for Bubach; second, 50c, to J. A. Cross of Spring Lake, for Marshall.

For the best box for market (color, firmness, and form to rule), first, $1, J. G. Hancock of Grand Haven, for Lovett; second, 50c, to Geo. C. Borck of Grand Haven, for Cyclone.

For the best collection, not less than five varieties, for market, first, $3, Wilson, Bubach, Leader, Marshall, and Greenville, by Chas. Hill of Spring Lake; second, $2, to J. G. Hancock of Grand Haven for Wilson, Bidwell, Lovett, Saunders, and Beder Wood.

Creditable exhibits are also made by J. G. Hancock, of Beder Wood and Lovett; by Louis Vanderkolk of Ferrysburgh, of Jessie and Gandy; J. A. Cross of Spring Lake, Bubach and Parker Earle; Eugene Gardener of Spring Lake, Bubach; Hans Wilson, Bubach; also a fine crate of Marshall offered by J. A. Cross of Spring Lake; and a number of new sorts grown at the Agricultural college, including Aroma, Jerry Rusk, Marshall, Glen Mary, Thompson 46, Sunnyside, Maumee, Woolverton, Apache, Clyde, Mary, Weston, Shawnee, Bird, Timbrell.

The room has been decorated by Mr. J. G. Hancock with a number of greenhouse plants and vases of carnations.

William B. Andruss of Allegan has placed on the tables seven plates of well-known and finely preserved varieties of winter apple.

L. R. TAFT,
M. A. THAYER.
R. M. KELLOGG.

RESOLUTIONS.

Remembering that when God had created a world, and then, as a sample of a perfect work by a competent architect, invented Adam and Eve, and pronounced the work "good", and as a suitable employment placed them in a garden and bade them keep it; and remembering that the limited market required not the generous assistance of good-natured commission men to dispose of the crop; and gladly remembering that the employment proved most agreeable and the profits large; and yet, sorrowfully remembering that their love of fruit could not be satisfied until the last was tasted, we now have a fellow-feeling of sympathy with all who like fruit, and we hope their number will soon embrace as large a proportion of the world's population as it did then; also,

Remembering the fireworks and the circus of our boyhood days, we do not exactly blame any one for the empty seats which have welcomed our presence here, and we do fully appreciate the difficulty in securing a large attendance at such a meeting at this busy time of year for labor, and most attractive time for recreation in the outdoor Eden.

Remembering that lovers of fruit prize quality above quantity, we are truly thankful to all the good people of Grand Haven and Spring Lake for the hearty welcome we have received here, for the cordial sociability which has pervaded all our intercourse, and for the pleasant remembrances we shall all bear away to our homes.

Remembering that the new broom sweeps clean, and learning that the custodian of this fine building has brushed around here more than a score of years, we wish to suggest that an old broom may sweep cleaner, judging by the exact tidiness of every crack and corner, and perfect neatness pervading every part of this courtly home, and we do thank him for his many courtesies, and all others who gave us this temporary biding-place.

Remembering that our friends here and away have remembered us by these fragrant flowers, tokens of immortality, we thank Prof. Taft, Mr. Hancock, and others who adorned the foreground.

That the lessons of the past should make the hours of the future brighter, better, and happier, we all resolved.

A. W. SLAYTON,
C. D. LAWTON,
D. R WATERS.

PAPERS AND DISCUSSIONS.

THE BETTER METHODS OF STRAWBERRY CULTURE.

BY MR. R. M. KELLOGG OF THREE RIVERS.

I am fully convinced that for the want of a proper knowledge of plant life and the laws which govern the breeding and propagation of plants, a large majority of fruitgrowers are not only throwing away their labor but are putting on the market a grade of fruit which people do not enjoy in small quantities, and therefore the markets are often glutted when people are eating but very little fruit. They demand large, luscious, firm, high-colored, "meaty" berries, instead of the small and insipid berries now offered them.

The whole question of market and high prices is governed by large consumption, and this can only be secured by inducing people to eat many berries where they now consume only one. No extra labor, as a rule, is needed if the life habit is thoroughly understood. The cost of growing our berries is too much; or, in other words, we are bestowing our labor on plants which have no ability to respond to our care, and we must proceed to breed them up to a higher fruiting ability.

The life principle (germ or plasm) of the plant is identical with that of an animal. The diverging line has never been definitely determined. Many plants possess characteristics of animal life, and move from place to place, while others catch insects and feed upon them and otherwise display a good degree of intelligence. All plants are male and female, and their sexual organs contain every named part of those of the animal, and fecundation takes place for the multiplication of their species. They have an intense passion for breeding, which, if not restrained, will produce seminal weakness and impotency or inability to produce fruit.

The seeds are the eggs of the plant, and the fruit or pulp develops only as a receptacle for the seeds to grow in. There are certain plants which develop fruit without seeds, as the banana and some others, but they are freaks. No one ever saw a large, luscious berry without the fullest development of seeds.

If the pollen and "pistil wax" lacks potency (in other words have only sufficient vitality to bring life into existence), the fruit can not be made to develop to its maximum size, nor take on the highest color and flavor, by any process of manuring and cultivation. You can increase the size of the foliage of the plant by this means, and perhaps enable it to partially recuperate, but until it can be strengthened in seed producing the increased culture will extend to foliage only. Abundant evidence of this may be had in the berry fields of the ordinary grower. There is the widest difference in the size, form, and color of the berries on different plants. One plant is loaded with fine specimens, while right by its side is another plant which has the same fertility of soil and culture but produces small and inferior berries. What is the cause? Simply, the second plant is a scrub. It does not have sufficient potency of pollen or high life-giving power. The pistils are also in a weakened condition. The seeds are lacking in vitality. It has been allowed to breed itself into impotency.

A careful examination of the plants of the average grower will show they are a mongrel mass. We can better understand this by using the analogy of animal and plant life. A few years ago we had only the all-purpose animal. Now, after a long line of matings and selections, we have special breeds for the dairy, butter, beef, etc. Horses and other stock have made the same wonderful evolution. Individual worth in an animal is the more valuable if its pedigree shows a long line of selection and mating expressly to produce certain desirable characteristics, so it will transmit these qualities to its offspring with great certainty.

Plants bred by the skillful horticulturist to produce large, luscious fruit, will transmit this quality to their progeny with equal certainty.

The name of the breeder of animals adds value in proportion to his known skill in developing them. So the propagator of plants who has made propagation a life study can detect variation and can bring together the good qualities necessary to accomplish the desired results. But, when once attained, the inexperienced grower can easily perpetuate them by carefully following the prescribed rules, and thus the beginner can reap the same reward as the skilled operator, and secure as great results from his capital and labor invested.

The successful cultivation of the strawberry requires that the ground should be rich in humus (decayed vegetable matter), so as to be soft and mellow, enabling the roots to penetrate to a great depth and fill the ground with fine, fibrous roots. To do this, plow under a crop of leguminous plants, like clover, or cow peas, and apply barnyard manure, about fifty bushels of unleached wood ashes, and 500 pounds of fine ground bone per acre. These will furnish potash and phosphoric acid, and thus secure firm, rich, and high-colored fruit. All manures should, if possible, be applied broadcast during the winter, so the rains will wash them down and incorporate the juices with the soil to make it immediately available when plants begin growing in the spring. Avoid plowing under any considerable quantity of straw, as it prevents capillary action from bringing the water up to the plants from the lower subsoil, and thus causes the ground to dry out.

There are four general systems of growing berries—the hill or single plant, the hedge row, the half matted row, and full matted row.

In order to understand the advantages of the different methods of planting we must just consider how plants grow. If the soil is properly fertilized and tilled, it would furnish enough food for all plants that could stand on the ground. Only about five per cent., by weight, of the plant comes from the soil, the balance coming from the atmosphere. The roots gather water and the minerals previously dissolved in the soil, and carrying them up through the tree to the leaves, where they are combined with carbon and other elements of the air, and digested, the leaves performing the same office as the stomach and lungs of an animal, after which the prepared food is appropriated by the plant.

This preparation of the food in the leaves can not be accomplished without the sunlight. Although a plant be properly supplied with food, it would starve to death by standing in the dark, and can only make a feeble growth in moderate shade. We should therefore only have as many plants to the acre as will permit every leaf and bud to come into contact with sunlight.

A series of careful experiments has shown that strong fruit buds will not form unless the sun shines on them. Hence the best results are obtained by giving each plant sufficient space so that its foliage does not interfere with another plant.

Hill culture may be said to be a process of consolidating several small plants into one large plant and many small berries into one large berry. When we cut a runner the strength of the plant goes to the formation of a new crown and fruit bud; and thus, by cutting runners as fast as they appear, we may build up a plant to a wonderful size and give a surprising fruitage. The ground must be very rich, and high culture given, to secure best results by the hill method. Plants should be as close together as possible and yet give needed sunlight and facilities for cultivating and gathering the fruit. If the horse used for cultivating will walk in a narrow row, set as near together as 30 inches, and eighteen inches in the row. If desired in check-row, set 30x30 and cultivate each way.

The hedge row will probably produce better results with the average grower, and is commended in all cases where ideal conditions can not be had. Let rows be 30 to 36 inches apart, and plants from 20 to 30 inches apart in the row, according to vigor of variety. Keep off all runners until about July 1, when weed seeds will have all germinated and been destroyed by the cultivator. Then let the runners grow and let the cultivator go the same way each time and throw them around straight in the row, so as to make a hedge one plant wide. Then attach the rolling runner-cutter to the cultivator. This machine raises the leaves and clips off the runners as they appear, without extra labor, and enables you to destroy all weeds and conserve moisture by cultivating almost the entire surface of the ground, saving hand weeding and maintaining a steady growth during any drouth that may occur. The alley furnishes abundant root pasturage and sunlight, and the plants will build themselves up to large proportions. They should be kept thinned to six or eight inches in the row.

The half matted row is the same, except that rows should be set about forty inches apart, and runners are allowed to form until they are from ten to fifteen inches wide. Plants should stand from eight to ten inches apart, so they have root pasturage and sunlight.

Probably three fourths of the berries are grown in the full matted row, but it is a mistake, and progressive growers are fast finding it out. It involves an immense amount of hard labor in pulling out grass and weeds, which is not required in hill culture or the hedge row. The fruit is always of a lower grade, and rarely more than two crops can be taken off before the field should be plowed under. Make rows four feet apart and set plants twenty inches apart in the row. If land is not very rich, set them closer together. Let the cultivator go in the same direction every time, so as to throw the runners around without tangling them, and, as they root, narrow up the cultivator. Some careful growers thin out the plants when they become too thick, but careless people never do that, and therefore are forced to sell their fruit at any price they can get.

A longer experience has convinced me that the use of the Z. Breed weeder in strawberries is a mistake. It is too harsh, and does more injury on most soils than is at first apparent. The new roots come out above the old ones, very close to the surface, and the teeth of the weeder tears them off, thus destroying the growth of the plant. Many growers have reported that it loosened the plants in soft ground, and on hard ground mashed and tore the crowns so the plants died. We have abandoned its use entirely, on our grounds, and use only the Planet jr. twelve-tooth cultivator with pulverizer attachment.

From the time the plants are set until freezing, they are cultivated every week, going about three inches deep in center of the row and barely breaking crust next to the plant. This brings the oxygen of the air into contact with all parts of the soil, rendering plant food available and effectually destroying capillary action. The water then rises to the loose earth and passes out toward the plants, where it is taken up by the roots. Crust which forms after a rain should be broken at once, to let the air in to the roots and conserve moisture.

The successful grower is always one who loves the business. Love is born of success in any business. If he does everything at the right time and in the right way, good results are quite sure to follow. He must and will learn to look upon every plant with affection, and minister to its wants from innate love. He never tires of the manure-fork, hoe, or cultivator. He is never satisfied with moderate things. He goes at his work with vigor and energy, because he finds more pleasure in it than in anything else. If a person can not bring himself to this condition, by all means let him keep out of horticulture. You will find it a whole list of disappointments, and an unprofitable business. Failure is born of aversion, which is another phrase for lack of energy and ability to put life into the work.

DISCUSSION.

Mr. Cook: I noticed one item in Mr. Kellogg's paper, and that was the use of water by irrigation. Now, the thought which occurred to me was, is water that he gets from wells and other sources equivalent to the rain that falls from the clouds, as a fertilizing medium? Is there anything we do not get in the water—don't we get from the atmosphere, or water falling through the atmosphere, something we do not get from wells or from reservoirs from which we irrigate?

Mr. Kellogg: Scientists tell us that the snows bring down a considerable amount of ammonia from the atmosphere, and the rains bring down a very little, not so much as the snow. We use the water from the river, from the millpond. We have a centrifugal pump and pump it up 1,200 feet through a six-inch pipe, and this we connect with a large hose—the hose we use is eight inches in diameter. I use a centrifugal pump driven by a wheel at present. I shall put in a large gasoline engine next year, unless I can make better arrangements with an electric light company for doing the pumping by water power. We take the water from a flume, and from it we get unquestionably a large amount of ammonia. We will take the rain when we get it. All plants will do better with rain, because dust accumulates on the leaves more or less, and if it is washed off they will grow much better. All housewives know that they must wash off the leaves of their plants as they do in greenhouses and other places, but we simply use irrigation as an adjunct to nature and apply water when the ground becomes very dry.

Mr. Cook: The reason I ask the question is that in using water from our water-works system during drouth we find it difficult to keep up the healthy appearance of the lawns. We wash the dust off the same as the rain does, but immediately after a rain the lawns come up, spring up without any effort.

Mr. Kellogg: There is an important point. Mr. Morse of Belding at one time came down to my place and got a few plants and took them home, and at a great deal of expense had prepared irrigation. He had sandy land. About three or four weeks after he got the plants he came back with them. He was greatly disappointed with the results. He had a pump and windmill, and he pumped water into a tank. He brought the roots back, they were about half as big as when he took them away, and he wanted to know what was the matter. I looked at them and inquired all about the fertilizing. He said the ground had been kept watered well, and I said, "How about the water?" He replied that he pumped it up during the day from a well, and then he put it on at night, just a little bit with a spray pump, just as you speak of, and he saturated them with cold water from the well every night and it just simply ruined his plants. I said to him, "Put a ditch in there and keep your water in the tank until it becomes warmer, and then put it into the ditch and let it saturate the ground fully." He did this, but his plants were blighted and he did not get as good results as he would otherwise. We are very careful not to let the ground overflow. This year we have not irrigated at all, but we put on about 1,500 or 2,000 barrels at a time on an acre. I do not think in future we shall use less than 2,500 or 3,000 barrels to an acre, but we flood it in ditches. I have the whole farm, 130 acres, so that I can run water all over everywhere through the hose. We have the ground cultivated and then make a little narrow ditch, and we let the water settle there and percolate out, and get it under the dust, and just as quick as the ditch dries down we go over it and keep that water right down. This watering of plants is a bad thing. The water will dry right out and kill a plant quicker than anything else of which I know.

Mr. Seymour: How far apart should the strawberries be placed in the row?

Mr. Kellogg: That depends on your plants. Get them as close together as you can cultivate them. Much also depends upon the size of the plants. Now, that Marshall plant, there, has a wonderful foliage, and you will have to leave about five or six or eight inches more for a variety of that sort than you would on the other—on the Wilson for instance.

MY EXPERIENCE WITH FOREIGN GRAPES.

BY MR. F. W. SURDAN OF MATTAWAN.

My first experience with foreign grapes was in 1892, when I imported from California fifty Thompson's Seedless raisin grapes, from J. P. Onstott of Yuba City; and twenty-six others, five each of Muscat of Alexandria, Muscatello Gordo Blanco, and Largo Bloom, raisin varieties, five White Frontignan, three Emperors, two Flame Tokays, one Golden Chasselas, these from California Nursery company, Niles, Alameda county. They were good stock, and all grew; but the spring was very wet into June, and they were drenched nearly every day. Later it came off hot, then dry; when, finding the clouds had stopped to rest, I turned in with the watering-pot and gave them a heavy shower once per week, right over the foliage, at the most convenient hour of the day. By September the leaves were gray and yellow with mildew. It was a severe attack, the first and last of mildew of any importance thus far; but it taught me a lesson, never to wet the leaves during hot sunshine.

Just before hard freezing weather, about the middle of November, I bent down the vines carefully and covered them with two or three inches of earth. My impression at the time was that a little straw next to the vines would be better; yet, not knowing why, I covered them with earth only. In the spring I learned why (another important lesson): the wood and bark were green and fresh up to the point of freezing back in autumn, but by contact with earth the buds had rotted.

All but one of the vines started from the bottom, making fair but varying growth, Thompson's outdoing the others. Cutting a branch three inches in length, containing two buds, from a Muscatello just bursting into leaf, I planted it, bottom end up, beside the one dead vine. Finding it was doing well, I placed it right end up, watered it, and it grew into a nice, thrifty vine two or three years old, then died—from excessive drouth, probably.

I also received from California, and planted, twenty cuttings each of Rose of Chili, Muscat, and Malaga. About two thirds of these grew a little, when the grasshoppers stripped them of leaves and destroyed nearly all.

Having set more vines of the first-named varieties, adding Malaga and Rose of Chili, again in November I covered the vines of Muscatello, Muscat, Largo Bloom, Malaga, etc., wrapping first a handful of straw around each vine, leaving the Thompsons, for trial, uncovered. Examining in winter, they appeared all right until the coldest weather. In the spring all the Thompsons were found to be killed back except two long vines lying close to the ground, which leaved out at the tips. The varieties covered were saved, buds and all, except the tips which were killed by early freezing.

When in full leaf, with six to twelve inches of new growth, and many clusters on old vines nearly in bloom, our unusually severe late frost killed every blossom, leaf, and vine nearly back to old wood of the foreigners, and nearly all of twenty native varieties I have. A month later, leaves and a few clusters formed on natives, and a few, mostly imperfect, bunches on Muscat and Chasselas. Covering them for protection from fowls, the Chasselas ripened in September were sweet and good, nearly transparent, but no larger than our wild grapes. The Muscats picked October 14 were compact in bunch, of same size and shape as a nice bunch of Concord, but with larger berries of a light-green color, covered with thin white bloom—in fact, identical in size, shape, color, bloom, and flavor with the Muscat exhibited at the World's Fair in October.

Having ordered in the spring 150 more vines (fifty each of Muscatello, Largo Bloom, and Purple Damascus), after a three-weeks trip by freight they arrived in June, in good condition—good, large, thrifty vines with twelve to fifteen extra count; but they had sprouted in the box from one to three inches, looking like cabbage sprouts wintered in a cellar. I heeled them in immediately, wetting the ground thoroughly, and covered them with boards until they had greened up and hardened, also grown a little. Then, taking a few at a time in a pail of water, I dug holes and planted them, filling in earth thoroughly among the roots spread out evenly, mixing earth and fine manure above, tramping and wetting until the holes were filled, then watering once or twice per week during dry weather. Thus planted, in the last days of June and first of July, when all in leaf, with young shoots from one to four inches long, all but seven of the 160 or more vines retained the growth made on the road from California and in the trench, and grew until checked by frost.

Last year (1894), the dryest season ever known here, I received from the same place, among other vines, twenty-six Black Hamburg, of which twenty lived, and fifty-five Muscat, planted in the same condition of leaf and twig, at the same time of year, except that they were watered until fairly started, then left without, and they grew even better than with water last year, growing finely up to frost, and I lost but four. But the winter of 1895 killed twenty-five or more of my young vines by freezing the roots when the ground was blown bare; and in the following May, when in the same condition as in the previous year, in full leaf and vigorous growth, the blooms almost bursting on Muscat, Muscatello, Largo Bloom, Malaga, Thompson's, and Frontignan, two more severe frosts killed every blossom, leaf, and twig on foreign and native vines here and elsewhere, and no grapes were grown except from second blooms or on highest lands and favored spots.

Thus two disastrous years have kept these vines from fruiting; but that they will fruit when native vines can do so, I am confident, for they are scarcely more tender in young growth.

But they have made fair growth. Last year the best of the Thompsons grew from eight to eleven feet in length, with three to five vines to the hill, and were two thirds of an inch thick at base. The best Muscat, Muscatello, and Largo Bloom, much more bushy in form, grew from four to eight feet and were over half an inch thick. The Thompsons grew right through dry weather, showing maturity before frost came. The others, checked by spring frosts, then for weeks by drouth, after the late August rains sprang into vigorous life and growth, and, though clipped in late September, to check their growth, were thrifty and green in middle October, when frost came, as grass on the fields in spring time.

To sum up, among the foreigners and natives, on soil generally similar, loam or loam and gravel, with similar cultivation, none except Concord among twenty native varieties made greater yearly growth than did Thompson's Seedless; and several natives made less yearly growth, with much less promise of future value, than the four other raisin varieties, including Malaga. All this is in denial of the assertion that "No European variety will do well here except under glass," and the widely circulated statement of the department of agriculture that "All will finally succumb to mildew of vine and rotting of fruit." I wish to state emphatically that, in my experience, it is not mildew but cold that is the greatest foe to the foreign vine in Michigan.

The growing season of 1896, in southwestern Michigan, was marked by a wide climatic change from the two preceding years. We had no late spring frosts, no long-continued rains nor parching drouths, but usually a shower, heavy or light, about once each week. Here is a record of many measurements made on the last day of May, of the growth of the principal varieties during that spring:

Muscat of Alexandria, set 1895, 1 to 2 feet; bearing vines, 2 feet 2 inches to 2 feet 8 inches; clusters generally about 3½ inches long, but on up to 5⅜ inches from first side stems to tip of cluster.

Muscat Gordo Blanco, set 1894, 15 to 34 inches in length; bearing vines from 1 foot to 2 feet 4 inches; clusters 2 to 4½ inches long.

Largo Bloom, bearing vines 1 foot 7 inches to 2 feet 8 inches long; clusters generally about 3½ inches long, but up to 4½ inches.

Malaga, bearing vines 2 feet 2 inches to 3 feet 6 inches long; clusters few, from 2 to nearly four inches long.

Thompson's Seedless, 2 feet 2½ inches to 4 feet long; clusters generally about 4 inches long, but up to 6 inches, with width of 2 to 3 inches.

These varieties were nearly a week longer and later in blooming and slower in ripening than natives. Thompson, Malaga, and Frontignan set comparatively few clusters. The three Muscat varieties bore heavily, a disposition they had manifested the two preceding years; even two-year-olds bore a few bunches. Thompson's ripened the last of August, were oblong in shape, of light golden color, thin but tough skin, meaty, of rather neutral flavor; in diameter corresponding to Delaware, but longer—from this size to very small—and entirely seedless.

White Frontignan is in color green, with thin skin; firm, meaty; shape and size, that of large Concords; of excellent Muscat flavor; ripens about 10th to 12th of September.

Malaga: Berries large, oval; flesh rather firm; color greenish or light-amber; of very good though not high flavor; in size and shape much resembles Goethe; ripens about the second week in September.

Largo Bloom and Muscat of Alexandria: Scarcely distinguishable in growth of vine, size, shape, color, texture, and flavor of fruit; but Largo Bloom seems to ripen a week or ten days earlier, becoming eatable from the first to middle of September. Berries light-green in color; skin thin but tough; form roundish; many berries conical or pyriform; firm, fleshy; in size from medium to very large, many of them larger than any grapes I have ever seen grown here, and equal to or larger than, if my memory serves me correctly, any of the hundreds of varieties I saw at the World's Fair in Chicago, in October, grown from New Brunswick to California, except Flame Tokay and Black Morocco; and they were of excellent flavor, among the best yet tested here.

Muscatello Gordo Blanco: Makes a ranker growth when young; is rather more tender than others to winter; berries of same color and flavor as the above, but a trifle smaller and more elongated, and the latest of all to ripen, requiring three weeks or more of September.

The climatic change from dry to wet weather, during the summer of 1896, affected many varieties. Black-knot, imported with a few vines, affected nearly every foreign variety—Thompson very little, but more or less three fourths of the others. I cut off the knots and burned them, and the vines healed, leaving little of scar. Black rot also appeared, hitherto unknown to my vines, affecting nearly all the Muscats and several Thompsons, some of them quite badly. But some of the natives were much worse, notably Massasoit, then Lindley, Diamond, Vergennes, Jefferson, Martha, and Concord, in about this order. After a heavy rain in August, mildew attacked the older foreign vines, and later, in September, most of the young vines. That these diseases on hitherto healthy vines, were the direct result of frequent and sometimes heavy rains, combined with the heat of summer, is very apparent.

The Secretary: I would like to know if any one knows of equal success in growing foreign grapes out doors in Michigan, or any efforts to do so. They are grown in greenhouses, but the importance of this paper is that Mr. Surdan really is successful in producing foreign grapes out doors in this state. If it can be done it is a matter of great importance to the horticulturists of Michigan.

Mr. Slayton: I have raised and ripened Black Hamburg out doors, by covering the vines during the winter with earth.

AN UNSAVORY PEACH CROP, ITS CAUSE AND CURE.

BY MR. JAS. F. TAYLOR OF DOUGLAS.

The outlook for a large supply of peach fruit this year is not very encouraging. To a casual observer, the closing days of 1896 and the early months of 1897 were truly flattering. While the autumn was not so warm as to develop the fruit buds unduly, or the winter so cold as to congeal them severely, our anticipations of an abundant yield for the autumn of 1897 are not to be realized.

The savory odors of helpfulness that came to us from the fore-shadowings of a bountiful fruit crop, with remunerative prices, have been thwarted by every change in atmospheric pressure, until the perfume of our peach groves is mostly of leaves. On account of this failure, when so many points in nature's progressive development seemed to converge toward better results, we deem it an unsavory crop. It will not be sufficient to satisfy the hungry palates that last year feasted for a song, while the ambitious producer went home hungry and discouraged.

It seems to be perfectly natural for a peach tree to produce fruit annually. When this regularity is broken, there is a definite cause and not unfrequently an obvious one. Soil and climate enter into the conditions in a marked degree. The former may be too lavish of wood production to render it capable of resisting the low temperature of a zero winter, or too sterile to produce fruit buds of fruitful capacity. But the climatic conditions are more obvious. We measure them with instruments and compare them with former results that have come within the range of our experience, and therefore are ready to attribute all failures, when they appear, to these potent causes.

The most frequent conditions of unfruitfulness are found in the following antecedents:

1. A dry summer, which ripens the fruit buds in early autumn, if followed by a warm October and a cold winter, is often injurious.

2. A very mild winter, which may cause the sap to flow freely, if followed by zero weather in March is more or less fatal to good results.

3. Early blooming, followed by cold, wet weather which is often productive of leaf-curl, causes the young fruit to drop, and proves a fruitful source of unfruitfulness.

Other conditions not so marked as those I have named, such as heavy rains while the trees are in bloom, and the depredations of insects, may at times greatly disappoint our fondest hopes; but there are evidently other influences at work, under the laws of practical horticulture, which are not so obvious or so highly appreciated, that enter very largely into the failure of the peach crop as it comes to us in this calendar year of 1897.

We must not forget that the science of pomology is broader and deeper than planting a tree and securing a vigorous growth. The preparation which nature makes for fruitfulness is not confined to a single year. One summer reaches forward into another. The fruit buds formed in 1894 gave an abundant crop in 1895, and those formed in 1895 gave an overplus in 1896. We have all been anticipating that the fruit buds formed in 1896 would produce like results in 1897. As well might a man attempt to perform two days' labor in one and keep it up the year round. Exhaustion of his physical powers, sooner or later, must come. Let us remember that nature's laws are so adjusted as to recuperate the life and growth of the tree or plant, as well as to produce fruit. They reach out after an equilibrium. If a large amount of fruit draws on the life of a tree in one year, wood growth and foliage come in for their share at the next turn of the rolling season. This is a marked characteristic of nut-bearing forest trees. The chestnut, the oak, the beech, the walnut, the hickory, in their native wilderness, commonly have alternate years of growth and fruitfulness. Some varieties of cultivated fruits cling very tenaciously to this habit. One year is a compensation for the other. All the ingenuity of scientific horticulture has failed to correct this undesirable tendency in any marked degree. And yet, with these facts continually before us, fruitgrowers have largely failed to avail themselves of the remedy that is within easy reach, where the habit of yearly production has been established. While some fruit trees show this tendency to bear only on alternate years, the peach is almost as fruitful in its preparation for a yearly crop. There seem to be but two potent causes to the contrary, viz., climatic conditions and productive exhaustion. If peach trees are ever rendered unfruitful by overproduction, this year should be one of failure from this cause, if for no other reason. Probably nine tenths of all the peach trees in western Michigan ripened more fruit in 1896 than was for the best interest of their vitality, while the quantity ripened in 1895 was nearly as large. From this standpoint alone we have abundant reason to conclude that over-production of the two preceding years is the potential cause of our present shortage. This conclusion is further confirmed by the following observations:

1. Some varieties did not form many fruit buds last autumn. This was evidently the direct result of over-bearing during the two previous seasons.

2. Some varieties showed a large percentage of immature buds before winter set in. These buds were found to be black at the center, as if they lacked maturity, and on this account they dropped from the trees before the blossoming season arrived.

3. Very many blossoms that opened in an apparently healthy condition were imperfect, or so enfeebled from some cause that they dried up on the limbs that bore them, before the germ had sufficiently developed to show a peach; and also before the leaf-curl had made its appearance.

4. Some varieties have shown but very little tendency to curl-leaf, and yet failed to hold the blossoms that promised a good degree of fruitfulness at the time of opening.

5. Fruit that drops as a result of leaf-curl does so after the young peach is well formed, whereas a large proportion of the peach bloom of this year that disappeared did so before the germs were sufficiently mature to show their right to be classed as fertilized flowers.

Other parts of this state and of our country probably had a temperature low enough to injure fruit buds, and suffered from cause, but this part of the lake shore was evidently exempt from that calamity.

In view of the various conditions and causes referred to above, we are decidedly of the opinion that over-production in '95 and '96 had more to do with the failure of '97 than all other causes combined. Over-production must, from the very nature of natural law, lead to enfeebled fertilization and ultimate failure. The remedy for future conditions of the same kind is too obvious to require discussion. Reduce the fruit-bearing branches, or thin the fruit, so that the root can nourish the top with such strong growing fiber as will hold the germs that form until the fruit is grown.

SOME POINTED FACTS RELATIVE TO UNION OF FRUITGROWERS.

BY MR. R. M. HEWITT OF PEACHTON, O.

That the farmer and the horticulturist are adverse to combinations among themselves, to secure greater advantages in marketing their produce, or to secure cheaper rates of transportation, cheaper packages, and a more honest commission service, can be attributed mainly to a prejudice that unaccountably exists in the minds of a large majority of the rural population.

This prejudice leads to a feeling of distrust of the mercantile abilities of themselves and their neighbors, together with a want of confidence possibly in the strict integrity of those to whom the management of any such combination would have to be intrusted. And yet these same individuals who are afraid to trust themselves or their neighbors, will ship their fruits and produce to commission men of whom they know nothing, seemingly with perfect confidence.

Instances are too numerous of flagrant outrages and wholesale frauds of certain members of this class of merchants to make it necessary to more than mention the fact. You all are doubtless perfectly conversant with the methods practiced and their frequency.

Is there no remedy? Most assuredly there is, and the farmer or the fruitgrower who fails to avail himself of the remedy is certainly blind to his own interests, and will continue to be the victim of dishonest commission merchants, and probably as great a calamity—that of fighting the battle alone and unsupported by his neighbors and friends.

In union there is strength. No greater truism than this was ever spoken, and whether applied to the union of states or the more modest union of individuals seeking to promote some worthy aim, it stands forth as a self-evident proposition.

Alone, what chance has the shipper of securing those advantages that come almost without being asked for by an organization or an incorporated company? As an individual he must submit to whatever charges railways, steamboats, or express companies may choose to make for the transportation of his produce to market. As an individual he may complain, with little hope of restitution, of the robberies committed upon him by the agents of these companies, or the proprietor and employes of some commission house. Alone, he is simply laughed at when he enters complaint. As a member of some influential organization, his rights, together with that of all others, are respected.

In these up-to-date times, no fruitgrower can afford the expense of informing himself daily of the state of the markets around him, or at any distant points. But the union can. The manager of a company of fruitgrowers, through the facilities afforded by the mails, telegraph, and telephone, can obtain all this information required, and the expense being divided among the members of the association is scarcely felt, and the better prices secured through the information thus obtained far exceeds the cost. Again, in the matter of transportation, a company can ship in carload lots and thus get reduced rates of freight, greater care being taken in handling, and many other advantages connected with shipments in large lots.

No one will doubt for a moment that the more valuable a patron of the transportation companies, the greater effort they will make to please him and secure his patronage. A fruitgrowers' union will even commend itself to the commission man. He will exert himself to a much greater degree to make good sales and prompt returns to a customer sending him a carload at a shipment than he would for one sending fifty or even a hundred baskets or bushels. The union can well afford to send an agent with a carload or boatload to sell it, or see to its being sold. This expense, when borne by a score or more of members, becomes a small item, comparatively. But there are other advantages in belonging to a company, and probably as great as those already mentioned.

The fruitgrower who picks, packs, and markets his own fruit is compelled to have a packing-house. Graders in these times are a necessity to establish a uniform grade throughout the season. He must not only employ enough help to pick his fruit, but enough to grade it, pack, and ship it. In a union where every facility is afforded for taking care of the fruit after it is picked, the individual grower is relieved of all care and responsibility in this respect, and can therefore devote his whole time to the picking. That this is one of the most important matters connected with successful culture and sale of fruits will be conceded, I think, by every experienced fruitgrower. Fruit picked too green or allowed to become over-ripe is unfit for market, and when shipped is usually sold at a great discount, aside from the bad odor it creates upon the shipper. We do not know of anything that will more certainly ensure the highest market price for fruit than the care given in picking the fruit at the proper time, and rejecting all knotty, wormy, and bad specimens. Such fruit, delivered at the warehouse of the company in good condition, can not fail to be classed as A No. 1, and when it reaches the consumer to receive the highest meed of praise. But if the grower ignorantly, negligently, and carelessly picks his fruit, so that it is not good when delivered to the packing-house, no amount of manipulation upon the part of the manager or the employes there can ever make good fruit of it. Therefore it becomes a matter of the greatest importance that the grower should be able to give his undivided attention to the harvesting of his crop, and this can not be well done when he has, besides, the grading, packing, and shipping of his fruit to oversee.

How, then, will he manage? There is but one best plan, and we know from experience that lies in the formation of a fruitgrowers' union. That is best when incorporated, with a building situated as near the shipping point as possible, large enough and sufficiently stocked with graders and all other necessary requisites to enable the management to take care of all the fruit during the season delivered by the members of the company. Here, then, we consider, is the solution of the whole question. First, an organization of the fruitgrowers, who will be required to deliver all their marketable fruits to the warehouse for the season; second, a commodious ware- and packing-house that will give ample room to do all grading and shipping, and storage for baskets in such quantities that will ensure no check caused from what is known as a "basket famine". Baskets can always be purchased in car lots at the beginning of the season much cheaper than afterward, especially if there should be a demand; and then, you are sure of your stock of baskets, which, to the management, is certainly very satisfactory; third, a manager and assistants to oversee and conduct the business upon business principles. Your manager then becomes the agent for each member of the company and does singly what each member would have to do alone if not a member of the union. That it is far cheaper to have all the fruit packed at one place, by one set of hands, for doing this continually for the season they become experts thereat, than to have it done by a score or more of growers, working separately, is also self-evident.

If there were no other reasons for the combination of farmers and fruitgrowers for protection, the fact that almost all mercantile enterprises in our cities are united more or less for self-protection ought to point out the great advantage of following the teaching contained in the adage, "In union there is strength."

DISCUSSION.

The Secretary: Mr. Hewitt fails to detail the plan of this union as clearly as was done by a gentleman in Holland recently. The fruit remains the property of the producer. Each man's fruit is graded by itself and a record made of it as it is brought to the house, and then is sold together with other of the same grade. Therefore, each man gets credit for his own fruit and is not able to participate in the sale of the better fruit of his neighbor, for they keep this record and so know what portion of grade No. 1 has been furnished by each man and sold. They establish their connections with dealers, and with commission merchants for aught I know, and having a telegraph office at hand they learn the condition of the market and make sales through agents in some cities and through reputable dealers in others, and by the plan they establish each man gets the benefit of his own fruit, even as the producer of milk does at his creamery, and a record is kept in the same way. Then payments are made along through the season as may be desired, and a statement made at the close. The scheme has been satisfactory to the stockholders. They have a limited number of stockholders, as a rule, aiming to embrace all the growers in a given vicinity who see fit to come in, and each man holds at least one share of stock, $100, I think. They are capitalized beyond the amount actually paid in, so as to permit of this growth of membership. I think those are the only points that have not been mentioned here.

Mr. Lawton: I was only going to remark that this method of marketing fruit seems to be a new idea, something that has developed in recent years, and if it goes on and becomes successful it looks to me as if it would lead to something larger; and that is, that in communities where fruit is produced largely it will be all bought by individuals or by a company or corporation representing capital enough, experience enough, and confidence enough; that they will have facilities for packing and for shipping, will know the markets and know the buyers, and know the methods of packing, and that they will handle all the fruit; that a person who raises it will bring and sell it right there at home, and there will be a company to handle, ship, and get it into the hands of the consumers in better shape, more satisfactorily, than could the producers, and they will know how to get their transportation properly, at a low enough cost and with safety and convenience, and the consumers will get it just exactly as it is represented to be. Of course, this method of packing fruit, where everybody packs it and everybody does it differently, and each gets a little different package and makes a different grade of fruit, a different quality, and it is all put up and sent to the general market where the good and the bad are mixed and jumbled together, the consumer does not know exactly what he is getting and the buyers all suffer for it. Something else must grow out of it besides this indiscriminate individual shipping and handling of fruit. It seems to me that on a large scale, the method set forth in this paper might be subject to objections. The paper says every individual is given credit for his own fruit and that a record is kept of every individual's fruit and he is given credit for just what he has. That would require a good deal of labor. Perhaps a large company could buy all the fruit and grade it and put the first-class and second-class and third-class each by itself and sell it by itself, and they would not have to keep a record with every individual. I am in hope that from this agitation, as I have noticed it all over the country, by and by the fruit business will grow into a system of that kind, when buyers will take all the fruit, handle it, put it up and put it in the hands of the consumer.

Mr. Kellogg: Mr. Lawton has struck the key-note to the whole business. Heretofore the fruitgrower has insisted on having all there was in the business—the whole grab. This is a day of division of labor. We invent machinery and we set one man at one thing and another man at another thing, and those men are expected to become efficient in their work and do it with great perfection. Now, when we get an association of fruitgrowers together whose whole energy and whole time is and should be spent in producing fine fruit, merchantable fruit, let that be their branch. You can not organize these institutions unless you put money into them. You can not get men to put money into somebody's else hands—they are suspicious about it, and business in that way is done at a loss. Now, the time has come when fruitgrowing has assumed such gigantic proportions that the marketing is such a big thing that one of two things will ensue—capital will come together for the purpose of engaging in the distribution of fruit, as a business, and there will be a central house and a standard of grading; and a man in his store in a distant state where fruits are not grown on a large scale can send his telegram for a certain grade, and know with a certainty as to what he is going to get. Now, I think the time has come, as Mr. Lawton says, when the fruitgrowers will bend their whole energies to producing a marketable fruit of high quality, and another class of men will bend their energies to a perfect system of distribution. It must be so. In some localities, where there are not large quantities of fruit, men may get together and do these things, but they must do them in a sort of retail way. A small business is like a ship. Mr. Carnegie now boasts that his ships will carry more ore to market than any other ships in the world, therefore nobody else can compete with him, because he does it for less. It is so in the fruit business. If you are to have the work organized you must do it on a large scale, and that requires particular skill in that direction, business ability. In the future, as Mr. Lawton says, business is going to be done on a new scale. I apprehend, in marketing in many of the little towns out of the large fruit belt, which has acquired so much fame and does business by the carload and shipload, the growers do not do as well as they can do. At Ionia we had competition when I was there, and the dealers were working in their own interests, and I went into a retail business myself. I retailed by the quart one day thirty-four bushels of strawberries and delivered them myself, and took orders for a little over sixty bushels by the crate, and got future orders for half as much more. The distribution was perfect, and in that way families told me they never thought of sending to the market for more than a quart or two of berries, and I worked them up so they would get three or four or five quarts, and it was not an uncommon thing for them to take a whole half bushel. They just took them and lived on them. If you manage them right, and if the growers will pay more attention to supplying the needs of their customers, they will get along a good deal faster and will make more money.

Mr. Graham: We have at Grand Rapids a system of marketing our fruit that has simply grown up among us; not that we started with intention of building up such a system, but we gradually came to it, from the fact that there were a number of the local dealers who bought largely of the fruit during the season, and shipped until they came to be very large buyers. I do not believe in the system advocated by this paper. I do not believe that it is practical. I do not believe it is a possibility to get a lot of growers together who will bunch their product, put it into the hands of concerns and let them handle it. It may be done for one year or for two, but I do not believe it will ever be an established method, for the fact of the matter is it is not "business." Growing fruit is one business, handling it and marketing it is another. I believe entirely in the idea as expressed by Mr. Lawton, of organized concerns for the purchase of this fruit as it is brought to market by the grower, to be graded by the purchasers as they see fit and marketed. Last year a number of us undertook at Grand Rapids to bunch our product. While we had no special organization, there were perhaps seven or eight of us who came together and agreed to ship our fruit through one concern. We were shipping east, and through one concern in the city, paying them a commission for handling. They loaded the cars; received our fruit as we brought it in, but did not grade it; it went to the market in the condition in which we delivered it. They saw that the cars were iced. One of the firm was at the other end of the road. We shipped in all seventy-five carloads of peaches and plums, with fairly satisfactory results so far as price was concerned. The man handled it at the other end; that is, he placed the fruit, he didn't sell it. Of course we had to pay a commission there, again, but he placed it, looked after it, knew what it was bringing, knew all about it. Now, we were neighbors and friends in this matter, well known to each other. We each knew what the other had, the kind of fruit he had, and the manner in which he would put it up. Each man received the money for his own fruit; it was kept separate and distinct, but it is an enormous job to do it even at that, even with a very few. It is almost impossible; and, while I said it was fairly satisfactory last year, the same people could not get together again this year, if we had the fruit to do it. One man gets a little more for his fruit than the other. It happens to go to a little higher market. Perhaps my fruit would go to Syracuse and my neighbor's would go to Utica. Syracuse would be a little bit off that day. I would know what he got for his fruit in that market and I would not be satisfied.

The Secretary: In this case the No. 1 fruit is put in a pool, all the sales of that day, and the growers are paid on that basis. Each man's fruit is not sold separately. It is graded separately, but it is all sold together.

Mr. Graham: The question is there, what is No. 1 fruit? You run your fruit through a grader, and in a great many instances fruit will grade No. 1 as to size and still not be No. 1. It is impossible to do this, I believe, so that fruit will bring the same price—bright, nice, firm fruit. Fruit varies when grown under different conditions (young trees, and all those things make a very great difference with the market value of fruit) and when you come to grade it I do not believe that the farmers or the fruitgrowers are business men enough to put their product together and ship it in that manner and abide by the result for more than one year at any time. I don't believe they will ever do it. Once in a while there will be one that will do it, but the great majority will not. I believe they must sell their fruit themselves, and I believe the time has come or is rapidly coming when all markets where there are fruit centers, either individuals or corporations, will purchase the fruit and ship it on their own account, making what they can themselves, taking their own commercial chances on fruit the same as they take on everything else of the kind, and they will make a good fair profit. It will soon bring others in. If one concern makes a large margin or profit this year, there will be two concerns started next year, and competition will regulate that matter. I believe that is the way to sell your fruit.

Mr. Reid: And the third year they will make a combination. There is very little I have to say, and that is simply in opposition to the idea that the fruitgrowers must market their fruit, sell it to somebody, and take no part in the marketing of it, nor pursue their business any further than the mere growing and selling of the fruit. If it really is true that growers of fruit can not combine and transact business for themselves and with themselves they would better stop all their complaints about the way they are misused under the present system. If they can not do better than that, they do not deserve anything better, and they certainly will not obtain it; and it would seem to me to be infinitely better for the fruitgrower, morally and socially and intellectually, as well as financially, if he could be educated into managing this business of sales and shipment of his fruit for himself or by these co-operative companies. If they sell to one institution this year, as Mr. Graham suggested, and that concern does pretty well, another will come in the next year, and perhaps there will be three or four the third year; and by that time the competition has become so sharp that not much money is to be made, and a combination will be formed. They will then have gone back to the original condition, and the grower will be absolutely at the mercy of the combination, having no choice but to bring his fruit to market and take what they please to offer him. It seems to me this co-operative plan of selling and shipping is better for the development and education of the fruitgrower than anything that has been tried in recent years, and it is possible that it can be successfully managed. If not, it is time for those who have any fruit to sell to sell it and stop their complaints.

Mr. Hancock: Mr. Graham said, as to the method of procedure last year, that the fruit was not graded. That is one of the features that the central packing-house system is to obviate; that is one of the defects. and the fruit, as I understand it, is brought into the central packing-house (the growers grade their fruit and bring it there). They are members of the association, it is their fruit all through. A man brings in a hundred bushels of peaches. He receives a credit slip for a hundred bushels of ungraded fruit. As soon as it goes through the hands of the expert grader he is credited with a certain percentage of his fruit, so much of No. 1, so much of No. 2, No. 3, and No. 4, as it will grade. So soon as it goes into the hands of the grader it loses its identity as his fruit; it belongs to the association, but he as a contributing member is interested in it. The fruit is sold in almost every case outright, and he is credited in the first place with his credit slip of a hundred bushels of ungraded fruit. Then he is credited with perhaps 40 bushels of No. 1, 30 bushels of No. 2, 10 bushels of No. 3, and 20 bushels of culls, which will make him his 100 bushels. Then he is credited at the close of the day's work with the selling price of all those, according to the grade and the quality he has brought in. This plan is, of course, comparatively new here. As explained by Mr. Owen at Holland, it has been in operation for five years, but in this same method of procedure I understand it has been practiced a good while with the oranges and other fruits of California. There are features in it that are admirable. There may be defects. Time will show that in both cases. Mr. Graham says that we must bring our fruit in and sell it and take what we can get. That is what we have been doing, and in most cases it has been very little at that. For the past three years we have not, in many cases, received enough for our fruit to pay the cost of harvesting and shipping, and I know last season, part of the season at least, the more a man shipped or the more he had to ship the more he was out of pocket during at least a part of the season. There is no doubt that at times, if we were following the central packing-house system, we would not make as much, but it is necessary that something should be done, and I believe there are features in this system that are good and the best thing perhaps that we have in sight. As has been already stated, there are two companies of this kind to be organized in this state this year, and I hope that their success will be so great that it will start us out in the right direction. We certainly need a change of some kind, and I think there are some good features of it. I understand also that this same plan is in operation in northern Ohio, in regard to celery, and I hope that the time will come when we can have something of the sort in operation right here in our own city along that line. There is certainly need of grading in our fruit and vegetables, and it seems to me this is the best method that has been brought before us for doing that kind of work.

Mr. Morrill: You will readily see that I am a little weak on this, not having had an opportunity to hear what has already been said, and never having had any practical experience in the central packing-house system. I have never seen it in operation. I can readily see where there would be some defects that perhaps could be easily remedied, but we understand how farmers as a rule do their work. It is not all alike, and there are some obstacles that I imagine those who have attempted it have had to overcome. How well they have done that I am certainly unable to say, but so far as our marketing generally is concerned we are very much in the position of the old maid who prayed for a husband, under the tree, and the owl in the top of the tree asked, "Who? Who?" and she answered, "Anybody, O Lord." I think any way to get out of our unfavorable position would be acceptable. I have always favored the Grand Rapids idea of encouraging buyers to come to the growers. It seemed to me it was practicable. They have taken the right course. Every man brings the fruit in there just as he pleases, and the buyer is right there and pays good prices to the man who delivers his fruit in good packages and in good condition. The central packing-house system, if enough will undertake it, seems a step in advance of that. It is a question entirely whether we are ready to accept these things. You gentlemen who have been at the meetings for years have heard this thing agitated year after year, and we have written precept upon precept and line upon line to furnish evidence to the different fruitgrowers in the community that there was money in moving ahead in this thing, improving our packing, and in co-operation; but it seemed to work out to little advantage until the time came that they were absolutely compelled to or wanted to. Now, it seems that there is a prospect of some practical organization. I know in our own town, for the first time, I see something that looks practicable. They are moving out (and, by the way, they had to have the help of a great monopoly to do that). The Armour company came in there, and are assisting the growers by practically managing the whole thing and simply taking what they can get and their transportation charges. They are shipping out from three to five, and I believe as high as thirteen, carloads of strawberries every night, going all over. They are furnishing the growers a good system. They are taking care of the transportation, the icing, taking and putting in any man's berries in any condition that he brings them, and he takes the result. They have cheapened the transportation and furnished good facilities, and it is certainly a great improvement. This is foreign to the central packing-house idea, but any way to improve our markets, our distribution, and our methods is acceptable to me. I think the central packing-house system, applied to peaches and apples, certainly a step in advance.

Mr. Phillips: I would ask Mr. Morrill if he was fairly satisfied with the answers Mr. Owen gave in Holland while Mr. Morrill criticised the central packing-house system?

Mr. Morrill: O yes, sir. I criticised that to bring out those ideas. It is a fact that many of our fruitgrowers do not catch an idea soon enough to get much good out of it. It takes them years to catch a very simple idea. That is unfortunate, but true. When you come to a combination of interests, there seems to be a fear running through the minds of some of our fruitgrowers that somebody else is going to gain a little advantage, and they are going to see to it that they do not, because they intend to get the advantage first. We have found this condition in an attempt to let each grower pack his own fruit and grade it himself. He will slight his baskets, perhaps, and others will bring in full measure. Of course, the man that puts in full measure along with the man that puts in a slighted basket is not satisfied. Those things creep in, unfortunately, but this central packing idea applied to the fruits to which it is applicable, will do away with that quite largely, and I believe that it is a move in the right direction and will grow. I think it must. I think the conditions themselves will force it.

Mr. Graham: In reply to some of the criticisms that have been made regarding the few words I said. The remark was made that we have been handling our fruit with scarcely any profit at all, scarcely getting enough out of it to pay expenses. I wish to say that in Grand Rapids that has not been the case, that we have never had a central packing association nor any combination of fruitgrowers to sell our fruit. Even last year, the year of low prices, I believe the fruitgrowers in the vicinity of Grand Rapids got satisfactory prices for their fruit. I know that we did, and I believe that they all did who grew decent fruit, and the great majority of that fruit was sold on the market and streets of Grand Rapids to buyers who came right there and bought it and paid their money for it; and I still believe that that is the proper way to sell fruit. We have had a fruitgrowers' association there, and I think it has done us a very great deal of good; but that association has never handled the fruit. We have had an agent there whose duty was to keep himself posted, and the members of the association posted, on the markets all over the country, and in regard to all points about which fruitgrowers desired to know. We have been kept posted through that association, but we have never attempted to handle our fruit through it. We have offered every inducement, we have advertised far and wide for buyers to come there and buy our fruit, and they have come and bought it and paid us good prices for it. I believe that this is the way to handle fruit. I see a great many difficulties in the way of handling fruit through a central packing-association. As has been said, there are only one or two kinds of fruit that can be graded up to certain standards. What are you going to do with the rest of your fruit—your strawberries and cherries, and all that class of fruit that you can not grade? Are we going to establish a packing-house association simply to handle peaches, apples, and perhaps plums, while we are growing fruits of all kinds from the first of June through until winter? Shall we establish central packing associations to handle two or three kinds of fruit, shutting out all the dealers from coming in and participating in any profits or benefits, and then ask them to buy our strawberries and that class of fruit that we can not handle in that manner, on account of grading and so on? I believe in dividing the profits in this matter. I believe it is a separate and distinct business, looking up markets and handling fruit, getting the best systems and methods of transportation, and I don't believe the fruitgrowers themselves are the people to do it. Let them get together, form their associations, advertise their crops, bring in buyers, the more the better. If they have plenty of fruit of good quality, I believe the buyers will come and take it at fair prices.

TWENTY-FIVE YEARS WITH GRAPES.

BY HON. C. D. LAWTON OF LAWTON.

It is curious to note how closely the experience of men in any line of agricultural industry of today corresponds with that of some other people of some other nation in some other period of the world's history. It would be possible to glean from the contemporary writers of the Roman empire of the year 1, material for an article on grape culture, setting forth the experience and methods of the vineyardists of that time, to be read at a meeting of Michigan horticulturists assembled in the city of Grand Haven in the year 1897, and no one would detect but that it represented the conditions and experience of the growers here today. The men who were engaged in growing grapes on the shores of the Mediterranean and the Adriatic 2000 years ago, as we may learn from the writers of that period, met with similar difficulties and discouragements and give similar directions in the matter of cultivation and general care of a vineyard as are experienced today by men who are pursuing the like vocation along the shores of lake Michigan and lake Erie and on the banks of the Hudson.

We have it from the record that is familiar to every one that one of the first operations of Father Noah after leaving the ark was the planting of a vineyard: "And Noah began to be an husbandman and he planted a vineyard," saith the scriptures. And this was long anterior to Roman history, and, probably, even in the time of Noah, the industry was not a new one. It was old even then; and then, as ever, the grape was a favored product of the soil, for it alone is mentioned as the branch of agricultural industry in which the patriarch engaged. Thus, so far as we have any record of the doings of the human race for its maintenance and support, the cultivation of the vine has ever been an important fact in husbandry. In Palestine, in Italy, Spain, France, and Germany, in all parts of the world where fruits may be grown, the universality of grape culture and the high esteem in which the fruit has ever been held testify to its great excellence and superior value. The cultivation of the vine from time immemorial has been a chief employment of the children of the east, and to sit beneath the vine and fig tree has ever been a favorite dream of felicity in the minds of the human race. Men in every age have dwelt with longing upon that condition of life which is symbolized by the vine as among the happiest allotted to mortals. The vine, in all ages, has been the emblem of plenty.

In this country, with our abundant and varied productions, so far in excess of our capacity for consumption, it is not possible to fully appreciate the importance of the grape to the people in other lands. There are regions in the old world, nationalities or considerable portions of countries, in which the loss of the grape means far more than the restriction of prosperity, for it means the loss of a prime necessity of life, of a chief article for sustaining the existence of numberless human beings. In this country, which is, compared to the old nations of the world, only in its infancy, the grape has already become a leading fruit. The cultivation of the vine is an industry of first importance in many parts of our country; and in our markets everywhere, in the season of ripening, the grape is one of the most noticeable articles of sale, and upon our tables it has become a most common article of diet.

While grapes are grown almost everywhere in the United States, their production extensively, as a commodity for general market, has been mainly developed in the last thirty or forty years.

Grape culture, in this latitude, received its greatest accelerating impulse on the discovery or the originating of a few varieties which proved to be better adapted to general cultivation, to the conditions of soil and climate over a wide extent of country, or that was especially adapted to certain limited areas where they were produced of superior excellence and with certainty. Of these kinds there are three that are universally known and esteemed, namely, Concord, Delaware, Catawba. It is a singular fact that these varieties, which are the foundation of grape-growing as a market industry that has become so important in Michigan, New York, and Ohio, still hold the place they originally assumed at the head of the list—Concord and Delaware as the best market kinds for general cultivation and Catawba for the special localities where it holds unrivaled supremacy.

In later years there has been an endless list of varieties of grape originated, some of which have been lauded to the skies, heralded with flourish of trumpets, and sent out at great cost to the purchaser. By such extraordinary efforts some of these productions have been extensively sold and planted and the originators have reaped considerable profits therefrom; but still the plain old Concord holds its place at the head of the list and is just as much a necessity as heretofore, as the basis for a vineyard, the most reliable grape for home and market use. Concord and Delaware are the two kinds that anywhere in the interior of our state insure success. The many new varieties come in and go out. The originators and disseminators of them make money, possibly, but those who buy them and plant them in quantity do not. I wish it were otherwise. I wish we had a general-purpose grape that was superior to Concord; that is, one that had a thicker skin, a more tender pulp, was less likely to crack, was a better keeper, and withal was equally prolific, equally hardy, and equally well adapted to such various conditions of soil and climate.

But it is nevertheless a fact that with all its faults, the Concord yet stands without a peer, the foremost, hardy, productive, reliable grape for market and home use that we possess. If one sets a vineyard, he sticks to Concord, if he is wise. At Kelley island and along lake Erie where the Catawba can be readily grown, that variety might take the preference, but not elsewhere east of the Pacific coast.

There are other black grapes of proved excellence for general cultivation that come before Concord in time of ripening, that are very desirable and should not be ignored. The best known of these are Worden and Moore's Early, given in their relative position in point of preference, though the latter is the earlier in time of ripening. They are good for the table, hardy and reliable, and begin the season earlier.

The old, well-known Delaware is universally the favorite red grape. There are others that are fair to good, but none that possess all its merits, none to supersede it. Undoubtedly it is the best red grape in quality and the best for profit. Delaware vineyards here that are thirty years old are as vigorous and productive as ever, and if not so profitable as they were years ago it is from no fault of the vines. Formerly it was not unusual to sell the first shipments of the season of Delaware grapes for 60 to 75 cents per basket of five pounds each; and for single vines to net $2.

There are other red grapes that are quite satisfactory, though not of equal merit with Delaware. Perhaps the most worthy of these with reference to general cultivation, are Brighton, Jefferson, and Salem may be added, in limited quantity. Brighton is of good quality, a fair bearer, is early, and sells well. Jefferson is later, one of the latest of the season. In fact, it may be left until snow comes and still be in good condition for market. It is a uniform bearer, of good quality, hardy, and sells well. Salem on high ground in good soil, with good care, is a profitable grape; one of the handsomest and best for table and market.

By far the best of the white grapes for general use is Niagara. I have a Niagara vineyard of 500 vines that has been set sixteen years, and while it has not equalled my expectations in matter of profit, it has paid fairly well as compared with other varieties. The Niagara grape is exceedingly variable in quality. Some vines will, perhaps, have fruit that is very good and others at the same time that is quite the reverse in quality. The same is true of clusters. Sometimes, on the same vine, where the fruit is well ripened it hangs well and is agreeable to the taste and holds its flavor to the last. The vine is a very strong grower and stands our severe winters in southern Michigan admirably. Of the white grapes it is the one for the vineyard par excellence. An early white grape worthy of consideration is Moore's Diamond. I have lately planted it quite largely, after giving it something of a test.

High rolling lands are best for vineyards; lands with sandy, gravelly, slightly loamy soil. On such lands, in southern Michigan, the kinds of grape I have mentioned are as sure as wheat or corn. Frosts will sometimes injure them, but not more often than other crops are so affected. In the production of any crop, certainty, or the nearest we can attain to that desideratum, is an important consideration, and therefore in the cultivation of the grape in the interior of the state low lands are to be avoided. Only the hills, the high lands, should be chosen. It sometimes happens that vineyards on the low lands will yield a full crop of fruit, but perhaps as often they will not. There is certainly an equal likelihood of failure, and the quality of the fruit when it is produced will be inferior. Soil and location have much to do with the quality of the fruit, and it is unfortunate and distressing to have all the labor and expense of caring for a vineyard and have no return. The failure of the crop is a serious set back to most producers. The importance of elevation, of suitable location, is very apparent in this vicinity at the present time. In the latter part of May there were several quite severe frosts which injured the grape vines on low lands, in whole or in part destroying the young clusters of fruit. Fortunately, by far the greater portion are so situated as to have wholly escaped injury. But there is enough to point the lesson.

In raising grapes commercially, the matter of situation with reference to market impresses itself upon the attention now as never before, for the reason that the vastly increased production has reduced the price of grapes to so great an extent that nearness to market or the cost and ease of transportation to market have become very important factors.

Unless there is a local market, and generally there is not, that will absorb the fruit, it must be shipped to a distant one, and it is essential to success that transportation shall be direct, ample, and cheap. There is no use at all in attempting to raise grapes for market unless the facilities for transportation are every way favorable. The profits to the producer are too small, even under favorable circumstances, to justify one in expecting success too far from a main line of railway or regular lake transportation. The increase of trouble and expenses will be too great for profit.

In this matter of transportation, there has of late been immense improvement generally. Railway managers and vessel owners have learned how to provide the facilities and to lessen the cost, so that now fruit of all kinds goes to market very cheaply and very satisfactorily as compared to what producers were compelled to endure a few years ago.

During the latter part of the season of 1896 the Michigan Central carried our grapes from Lawton to Chicago for ten cents per hundred pounds, and it is expected that this rate will prevail for the season of 1897. The distance is 124 miles. Via the South Haven and Eastern railway and across the lake the cost was thirteen cents per hundred pounds. Over both routes the fruit is well handled and effort made to exclude delay. Twenty years ago it cost several times as much, and there was nothing like the promptness and care on the part of the companies that prevail now.

Then, too, in the business of raising grapes for market, great advance has been made in the matter of packages. The Climax basket as now put up was an accomplishment vastly to the advantage of the vineyardist. We once had to put up our grapes in boxes or flimsy baskets and to cover the baskets with tarlatan or mosquito netting (a slow and tedious operation), and the baskets were not strong enough or so made as to render the fruit secure. Now the Climax basket, holding eight pounds, made neat and strong, costs only $18 per 1000; I once paid $60 per 1000 for a much poorer basket of the same kind; and prior to that the frail, wire-handle basket with flimsy covers was even greater, I think. The truth is, that under the conditions that prevailed twenty to twenty-five or more years ago, it would not have been possible to have marketed the grapes which are now raised. The facilities for harvesting and marketing the grapes have developed with the increase of production. It may be added that the market itself, the demand for the fruit, has had to be created. People have had to acquire a taste for grapes. They have had to become an article of everyday table use, to be bought and consumed by all classes of people, to be as freely eaten by the laboring people as by the wealthy. Thirty or more years ago comparatively few people knew anything about grapes. Country people were familiar with wild grapes in the woods and city people with hot-house and imported grapes, while now the grape has become the most common and familiar of fruits. The mass of the people have had to learn to eat them and to like them and to find them to be a necessity in the household economy, and thus the market has grown.

The raising of grapes requires some skill and a knowledge of the work, and thus experienced labor has had to be developed extensively. Planting, trimming, trellising the vines, picking the fruit and packing it properly, are matters that had to be well learned by a large number of people, and thus an army of men and women have become skilled to do this work.

It is much easier to care for a vineyard now than it formerly was; vastly so. Not that anything new or surprising has been developed, but the methods are simple. They have learned to follow the simplest courses, to adopt the ways that are the most advantageous. There was once much diversity and crudeness displayed in pruning. Now nearly every one pursues the simplest of all methods, to-wit, a single cane from the ground and four arms, two on each wire extending either way from the main body. All vineyards now-a-days are provided with trellis, consisting of two No. 11 wires, fastened to posts, set about 24 to 30 feet apart along the rows, the top wire about five feet above the ground and the lower wire at about three feet. To these wires the main cane is fastened in an upright position, and to them the four arms, extending laterally, are also tied. These arms contain a sufficient number of buds —forty or fifty—to assure the crop of fruit, provided the steel-beetles and cut-worm do not interfere too largely. These are the main insect pests that have thus far appeared to destroy the fruit. The beetles, when they abound, are gotten rid of by picking them off or knocking them off into a basin holding a little kerosene. The cut-worms are much more serious. They are sometimes very abundant, and if left alone will greatly deplete or utterly destroy all the buds in the vineyard, causing the vines to look, in June, nearly as bare as in October. They consummate their ravages in the night, and once men with lanterns hunted and destroyed them, a very expensive and ineffectual process. Then it was found that using tin about the vines and posts was a good preventive, and here at Lawton this course became generally adopted. But tins are expensive and the work of placing them and removing them is considerable, and it was like a bonanza in the way of labor-saving when they learned that a light band of wool tied about the cane was equally effective. I think the people of Lawton first got the idea of using wool for this purpose from Prest. Morrill at the time of the meeting of the State Horticultural society at Lawton some years ago. Soon after, a few of the vineyardists began experimenting with this method of shutting off the cut-worms, and announced that they found the process effective. The result is that now everyone has adopted this little scheme, and it is an immense saving in time and labor and a great relief from anxiety.

Unless cut-worms are circumvented, there is no assurance of a crop of grapes, and the band of wool about the vine seems to be a tie of safety.

Again, in the matter of machinery for cultivating the vineyard, there has been considerable advance. Much of the hand labor that was formerly necessary has been eliminated by the use of the horse hoe and other improved appliances which render a saving in time and labor.

Formerly, a small vineyard, yielding a comparatively small quantity of fruit, afforded quite an income. Now-a-days it requires a large vineyard, a great deal of fruit, to bring an equal sum of money. The margin of profit has been so greatly reduced that it so nearly approaches the vanishing point as sometimes to vanish utterly. In raising grapes for a livelihood, it has become far more necessary than ever before to observe all the conditions that tend to success or failure. This is now so well understood by experienced grape-raisers that, while there is not so great confidence as used to prevail, and less enthusiasm manifested among vineyardists and those seeking to engage in this industry than there was years ago, still grape-growers are not entirely discouraged. They look at the business through a revised medium. They realize that the fruit must be grown cheaply, transported cheaply, and sold cheaply; that is, that a portion of the receipts for sales must be sent to the producer and not be all taken up by the transporter and seller.

The transportation companies have come down a good deal, and seem amenable to further pressure; but it remains to reach the men who sell the fruit, the commission men, who still seem averse to relinquish the habit they have acquired of retaining the lion's share of the proceeds of sales. Some missionary work is needed among this class. Legal appliances or a radical tearing up and change in the whole system is in order. As the man on the raft said when in deep water and his pole would not reach bottom, "Something must be done."

It is certain that the growing of grapes for market will continue to remain an important fruit industry in this state. There is no fruit more bountiful, more healthful, more desirable in its season, and no fruit that under proper conditions will more munificently reward the cultivator for his care and labor. The occupation has its æsthetic, its sentimental, side as well as practical and pecuniary. But it is not to be expected that everyone will betake himself to planting a vineyard. It is desirable, however, that enough should be raised to fully supply all markets, and that every garden should be provided with a few grape vines. There is certainly no reason in the world why every farmstead, every village home that possesses a garden, should not be supplied with a few choice vines properly trained and cared for. It is neglecting one of the choicest gifts of Providence in refusing to avail ourselves of the enjoyment of the choicest blessings that he has allotted to us.

DISCUSSION.

Mr. Barnett: I would like to ask the essayist, Mr. Lawton, just what he expects the commission man to do, because he has given him a kind of dig, as usual (it is common, you know); what compensation he receives for selling grapes and what is expected for that compensation, taking last year as a basis, which was unprofitable, and whether he thinks the compensation was excessive. I think the paper will bear that question.

Mr. Lawton: What I expect is that the commission man will sell the fruit on its merits and return to the producer what belongs to him, reserving his commission for selling, whatever is agreed upon—if it is ten per cent, all right; but I want him, if I put up good fruit, superior fruit, put it up well, take all the pains in the world cultivating it and producing good fruit, and pack it well, to sell it on its merits. I do not want him to return the same price that he does to somebody who puts up inferior fruit. I want the fruit sold on its merits and the producer to receive the reward of its merit, the commission man to receive all that he is entitled to, and to return to the producer what belongs to him. Complaint to the contrary of all this is sometimes made. I have not entered into that complaint much myself. There is some justice in it though, I am quite sure, because I have investigated enough myself to know that there is sometimes a foundation for the complaints that are made that producers do not receive all that belongs to them and they are not treated with the degree of fairness that they should have on the part of the commission man.

Mr. Barnett: I think the gentleman did not quite understand my remark. It was not as to the practices alluded to there, and the rates of transportation have been reduced to ten cents per 100 pounds. Now, then, what would be a fair estimate in the mind of the speaker, for the work which he has outlined very fairly and justly, that the commission merchant should receive for the performance of that work? In other words, is the rate per cent. of commission too high, in his judgment?

Mr. Lawton: The usual rate of commission is ten per cent. The baskets are rated at eight pounds. They take off transportation and take off ten per cent., and send the producer the balance. I do not know that ten per cent. is too much; I don't know whether it is or not. I think perhaps if a commission man received a large quantity of fruit he could afford to handle it for less. Of course, in a smaller quantity, I don't know about it. I am not complaining about the rate of commission, the percentage charged for selling, whether it is ten per cent. or five or eight, so much as I am that whatever the percentage is he should confine himself to that and give the producer all that belongs to him.

Mr. Barnett: I thought the speaker believed the rate of commission ought to be reduced. The other matter, I believe, comes up this afternoon.

HORTICULTURAL LEGISLATION.

BY HON. R. D. GRAHAM OF GRAND RAPIDS.

I have not taken time to prepare any paper on this topic, but have brought with me a list of bills that recently became laws, and also the laws of 1895 with which I presume you are all familiar. I think the only new law of 1895 is what is known as the "compulsory spraying law," and I presume you are all familiar with that; if not, I will try to answer any questions in regard to it. It is simply a question of compulsory spraying for diseases and insect pests. That law was amended at the beginning of the last session, at the request of the State Horticultural department so as to include the San José scale. It is a very slight amendment. The only change in that law is this: "Provided, that if such trees and vines are infested with San José or other scale insect, such trees or vines shall be either effectually sprayed or destroyed." This is the only amendment to that. Two years ago it was not known that we had San José scale in Michigan, and indeed it was not until very recently, and about as soon as it was discovered this law was amended so as to give the department the opportunity of which they have availed themselves, I understand, and are doing their best to exterminate this pest in the state.

A year ago this month, at the horticultural meeting held in St. Joseph, there was some discussion as to the question of legislation to prevent introduction of diseased trees and vines. At that time President Morrill was authorized, by a vote of the society, to appoint a committee to look this matter up and to draft a bill if they considered it necessary. The committee was appointed, and met some time last January, and after spending considerable time in the preparation of a bill, this is practically the result of their labor; and with your indulgence I will read the law as it now stands.

SECTION 1. *The People of the State of Michigan enact,* That it shall be the duty of the State Board of Agriculture, immediately upon the taking effect of this act, to appoint some competent person who shall be known as state inspector of nurseries and orchards, who shall hold office during the pleasure of said board, whose duty shall be to inspect any and all nurseries in the state of Michigan, as to whether they are infested by the San José scale or other injurious or destructive insects or infected with infectious or contagious diseases, and if upon such inspection he find no such dangerous insects or diseases, he shall upon payment of the per diem fee hereinafter provided, give to the owner of such nurseries a certificate to that effect, and shall file a duplicate certificate with the State Board of Agriculture; and in case he shall find present in any such nursery any of said dangerous insects or diseases, he shall notify the owner thereof in writing, and shall direct him within five days to use such means as will exterminate such dangerous diseases or insects, and the owner of such nursery shall not ship nor deliver any such trees, vines, shrubs or plants affected by such dangerous insects or diseases until he shall have secured from said inspector a certificate as aforesaid.

SEC. 2. The owner of such nursery, trees, vines, shrubs or plants shall, within the time specified in such notice, take such steps for the destruction of such insects or diseases as will exterminate the same, and he shall not ship nor delievor any such trees, vines, shrubs nor plants affected with such dangerous diseases or insects under the penalty of a fine of one dollar for every tree, vine, plant or shrub so affected, when shipped or delivered from such nursery, which fine shall be collected by suit by the prosecuting attorney of the county in which said nursery is located.

This requires, as you see, every nurseryman, before he sells his trees or offers them for sale, to have secured from the board of agriculture or the inspector a certificate as to the health of his stock. That provides for our own nurserymen.

SEC. 3. Whenever it shall happen that the state inspector of nurseries and orchards shall give the notice heretofore required to the owner of a nursery, for the destruction of the insects or diseases mentioned, and said owner shall fail or neglect to take the measures necessary for the destruction thereof, within the time mentioned in the notice given him, it shall be the duty of the state inspector of nurseries and orchards to have the proper remedies applied to such nursery for the destruction of such diseases or insects, and shall employ all necessary assistance and may enter the premises of said owner of such nursery for the purpose of treating and exterminating such insects or diseases, and the said owner of such nursery shall be liable for the costs of such proceeding, for the services of the inspector at a rate per diem to be fixed by the State Board of Agriculture, not to exceed three dollars per day, and for such number of days as said board shall determine, which said charge must be paid before delivery of the certificate in section one of this act.

The bill as drawn by the committee and reported by the house committe allowed five dollars per day for these services, which should have passed, but the economical streak had taken hold of the house members and they cut it down to three dollars, which is not, in my opinion, a sufficient amount to pay for this class of work.

Sec. 4. Whenever any trees, shrubs, plants or vines are shipped into this state from another state, country or province, every package thereof shall be plainly labeled on the outside with the name of the consignor, the name of the consignee, the contents, and a certificate showing that the contents have been inspected by a state or government officer, and that the trees, vines, shrubs or plants therein contained appear free from all injurious insects or diseases. Whenever any trees, shrubs, vines or plants are shipped into this state without such certificate plainly fixed on the outside of the package, box or car containing the same, the fact must be reported within twenty-four hours to the State Board of Agriculture by the railway, express or steamboat company, or other person or persons carrying the same; and any agent of any railway, steamboat or express company, or any other person or persons who shall violate the provisions of this section shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than twenty-five nor more than one hundred dollars, or imprisonment in the county jail not less than five nor more than thirty days, or may be so fined and imprisoned in the discretion of the court, and any such fine shall be paid to the State Board of Agriculture.

With this section the committee had a great deal of difficulty. The laws of Maryland and some other states require railroads and all common carriers to hold such stock subject to an inspection, and notify the inspector or board, and hold the stock pending inspection; but it has been discovered, I think, that that is unconstitutional (it comes in conflict with inter-state commerce laws), and they are not attempting to enforce that provision in other states where they have it. They are afraid to test the law. To avoid that, we merely make it the duty in this connection to report to the State Board of Agriculture the name of the consignor and the name of the consignee. The state board or inspector is supposed to know, nearly, what nurseries throughout the country are infected with these diseases or are infested, and if the stock comes from an infected nursery it is a very easy matter to follow it up and know where it goes and where it comes from, and that avoids the question of constitutionality.

A Member: That applies, does it, to all packages of nursery stock coming into the state?

Mr. Graham: All packages of nursery stock; yes, sir.

Sec. 5. Any person or persons growing or offering for sale in this state any trees, vines, shrubs or plants, commonly known as nursery stock, shall, on or before the first day of August in each year, apply to the State Board of Agriculture, for inspection of said stock under the provisions of this act and a license for its sale, and shall deposit with said board a fee of five dollars as a license fee for himself as principal, and a similar license shall be obtained for each and every agent or employé. Such license shall be good for one year and shall not be transferrable, and each of such persons, principals, shall execute to the State Board of Agriculture, a bond, in the sum of one thousand dollars, with two good and sufficient sureties of this state, satisfactory to said board, conditioned that he will comply with all the provisions of this act, and that upon demand he will file with the State Board of Agriculture a list of the persons to whom he has sold or delivered any such nursery stock, giving the species, together with the postoffice address of each purchaser. Failure on the part of the nurseryman, grower, agent or dealer to comply with the provisions of this section shall render him or them liable to the penalties of a fine of not more than one hundred dollars nor less than twenty-five dollars, or imprisonment in the county jail for not more than ninety nor less than thirty days, or both such fine and imprisonment in the discretion of the court, for each and every such sale. Such information shall be preserved and be for the sole use of the nursery and orchard inspector and his deputies: *Provided*, That the provisions of the preceding sections shall not apply to persons engaged in fruit growing, who are not nurserymen, who desire to sell or exchange surplus trees or plants of their own growing.

This is the section that gave us all our trouble. It is the important section in the bill. In this last section or proviso there was a very serious question to decide: "Any person or persons growing or offering for sale in this state any trees, vines, shrubs or plants," the law reads, to begin with.

Mr. Morrill: Then in the latter clause it nullifies the whole thing.

Mr. Graham: I do not think so. I think the distinction is very marked as to who is a nurseryman and who is not.

Mr. Morrill: It kills it by class legislation, I mean.

Mr. Graham: I think not. It was, however, an utter impossibility to enact a law requiring persons who desired to exchange or sell a few plants, strawberries, raspberries, or other plants that they might have, to a neighbor without that provision. They would come under the provisions of this law.

Mr. Morrill: A man who is known as a nurseryman, growing a certain line of nursery stock which is incidental to his fruitgrowing, will be prohibited from selling any stock, while his neighbor, not planting what is known as nursery stock, can sell the same.

Mr. Graham: He can sell any of his own growing.

Mr. Morrill: I suppose, as the fact now stands, there are a number of men in this state who grow lots of peach trees, who might be known as nurserymen, who have a large amount of small fruit plants, and they must conform to these requirements in order to sell these plants to their neighbor, while their neighbor who does not raise lots of plants as a nurseryman may sell those.

Mr. Graham: Yes, sir.

Mr. Morrill: And then it becomes class legislation and unconstitutional.

Mr. Graham: I think not. I think it is constitutional and is all right in regard to that.

Mr. Slayton: All legislation is class legislation, but the law in regard to stealing horses does not apply to you and me.

Mr. Graham: The bill as drawn reads that the nurseryman shall deposit with the state board a fee of five dollars as a license fee for himself as principal, and the bill goes on and reads: "and one dollar as a license fee for each and every one of the local or traveling agents or employes there engaged in selling such stock or soliciting orders for the same." That part was stricken out. It was amended by the senate so that it leaves the five-dollar license fee for the nurseryman or principal, and no fee for his agents. While they must procure a license it does not cost them anything to get it. You will recollect the opposition made to the bill itself by the nurserymen. There was very severe opposition made to the bill, and afterward, when they came to understand it better and had their hearing (quite a large number of them appeared before the house committee and had a hearing), they practically agreed to most of the provisions of this bill, but to some of them they did not, but they withdrew their objections. This bond which is to be given by the nurserymen was opposed very vigorously at first by our local nurserymen, but when they understood the situation they withdrew their objection to that. It is entirely useless to have a bond for our nurserymen in the state, but it is absolutely necessary to have one to enforce the provisions of this bill as against outside nurserymen, and it was for their benefit that the bond clause was inserted.

SEC. 6. No person, firm or corporation resident of another state, province or country shall engage or continue in the business of importing any trees, plants, shrubs or vines, commonly known as nursery stock, into this state, or of selling such importations within the state, or of selling such articles within the state, for subsequent importation into it, without first having obtained from the State Board of Agriculture a license to do business in this state as provided in section five of this act, and shall have filed with the State Board of Agriculture the bond therein required, together with a certificate of inspection by a state or government inspector or that of some person designated by the Michigan State Board of Agriculture for such purpose.

That section, I believe, was taken bodily from a bill drawn by the Illinois people. I think section six was their section. It is somewhat different from the one that the committee had drawn, and we thought it was very much superior. It is a very carefully drawn section.

SEC. 7. The State Board of Agriculture shall, upon receipt of the fee referred to in this act, together with the required bond and a satisfactory certificate of inspection, issue licenses to the applicant according to the provisions of this act.

SEC. 8. Whenever the commissioners under acts number one hundred and eight and one hundred and nine, session laws of eighteen hundred and ninety-five, known as yellows commissioners, shall be uncertain as to the existence or nature of any infectious or contagious disease or dangerous insect pest in an orchard or elsewhere, or in case any dispute shall arise between owners and commissioners, it shall be the duty of the said commissioners to notify the state inspector of orchards and nurseries, who shall at once investigate or inquire into the matter and suggest or recommend the proper remedies, and give all the information he can to aid in exterminating such insects or diseases, and his decision of the case and recommendation shall be final.

SEC. 9. It shall be the duty of the state inspector, whenever it shall come to his knowledge that any destructive insects or infectious or contagious diseases exist in any orchard in this state, or are supposed to exist, to investigate the case, and if such dangerous insects or diseases are found, he shall have authority to enter upon the premises and proceed according to the provisions of sections one, two and three of this act, in exterminating the same. In case the owner or occupant of the premises shall refuse or neglect to comply with the orders of said inspector within five days, the inspector shall employ such aid as may be necessary to carry out his orders and recommendations, the expense of which procedure shall be certified to the township board and by them allowed, who shall cause the same to be assessed as a special tax upon the premises concerned.

SEC. 10. The state inspector of orchards and nurseries shall have power to appoint such number of deputy inspectors as may be required, subject to approval by the State Board of Agriculture.

SEC. 11. All expenses incurred under the provisions of this act, not otherwise provided for, shall be audited by the State Board of Agriculture, and paid out of the general fund of the state, and the auditor general shall draw his warrant for the same: *Provided*, That all moneys collected by the State Board of Agriculture, under this act, shall be paid into the general fund of the state treasury.

It was the desire of the committee to make this commission self-sustaining, and I presume it will be practically so. We do not contend that the bill is perfect, but we do claim that it is a good deal better than the bills some of the other states have adopted. It is impossible to get a perfect law to operate between states, on account of the interstate commerce law. The United States congress have a similar measure under consideration, but have taken no specific action. I had a copy of their bill sent me by Mr. Taylor, and a great many communications from him regarding their national legislation on this same point, but they failed to agree on any bill.

This I presume is the most important of new laws relating specially to horticulture. In fact, it is practically the only one. There was an amendment proposed to the yellows law, inserting the same provision that we have in this, where the commissioner has to destroy trees, where he had to act under the yellows law. The law now provides that the township shall pay the expense, and the township board by suit collect it from the owner of the premises. That is very cumbersome and not very satisfactory. Some one had a bill introduced to amend that, to tax it up, the same as we provide in this bill, against the premises. I do not think the bill passed. I don't know what became of it. An attempt was also made to amend the package-marking law, and that bill passed the house. Instead of marking them in pounds, the capacity of the package in pounds, it was to be marked in bushels and fractions of a bushel, and the bill passed the house very satisfactorily and went over to the senate, and they included all fruit packages, specifically naming them, berry boxes and all kinds, and insisted on that amendment, which rendered the bill impractical and the amendments were never concurred in by the house. I do not remember of any other horticultural legislation in particular. I do not have any in mind at present.

Mr. Cook: Do you understand that this bill does away with the yellows commissioners?

Mr. Graham: No, it works right in connection with them.

Mr. Cook: How does the yellows commissioner examine for San José scale, or is that a separate matter?

Mr. Graham: That is in the compulsory spraying law, an amendment to that. San José scale is included among other insects.

Mr. Lawton: I understand in the compulsory spraying law there is no penalty attached to a lack of obedience to the law. Isn't that true?

Mr. Graham: It is practically a copy of the yellows law. I have the law here. Here is the penal provision, Section 6: "If any owner, township officer, or commissioner neglects or refuses to comply with the provisions of this law as set forth in the preceding section, and within the time therein specified, such person shall be deemed guilty of a misdemeanor and punished by fine not exceeding fifty dollars, or imprisonment in the county jail not exceeding sixty days, or both such fine and imprisonment, in the discretion of the court, and any justice of the peace of the township where such trees or vines shall be growing shall have jurisdiction thereof." This is just that much stronger than the yellows law, as to include the commissioners. Under the yellows law the owner or occupant is subject to fine or imprisonment for noncompliance, but the commissioner is not subject to a fine for the neglect of his duty, and we put him in the same category with the owner of the orchard and make him subject to a fine.

Mr. Lawton: Is that the spraying law?

Mr. Graham: This is the spraying law.

Mr. Harris: Is the commissioner compelled to act, except as his attention is called to it, or is he supposed to go forth and examine for himself and see that these things do not exist? Would he be allowed to go forth and examine?

Mr. Graham (reading): "It shall be the duty of said commissioners or any one of them (this is section four, after the appointment provision), upon or without complaint, whenever it comes to their notice that any orchard, fruit trees, or vines are infested with canker-worm or other injurious insects or contagious diseases, within their township, to proceed without delay to examine such orchard or vineyard." It would hardly do to enact a law requiring those commissioners to go from one farm to the other from one end of the township to the other and examine every orchard.

Mr. Harris: That is what I was getting at, whether it is necessary or not.

Mr. Graham: It is not compulsory upon them to make any extended investigation until they are notified some disease exists.

Mr. Harris: I believe that section 8 of that law provides that a yellows commissioner may order a tree out, but now it must be left to the state commissioner if there is any dispute. The man is not compelled to take it out until the state commissioner says so. Does section 8 of that amendment say that the state commissioner can order it out?

Mr. Graham: They are to leave those matters to the state commissioner. My experience has been this, the commissioner is not thoroughly satisfied that an orchard is infested with San José scale. He thinks it is, but he is not sure of it; he is not so positive that he will order those trees destroyed. This other bill provides that it shall be left to this state commissioner, and I presume that in any case that would be the practice, while I think he has absolute authority in any case where he is sure it exists.

Mr. Harris: I notice in that amendment in section 8, that it says that in case of disagreement between the owner of the tree and the commissioner, it should be settled by the state commissioner.

Mr. Graham: This is not an amendment, however: "Whenever the commissioners under acts No. 108 and 109, session laws of 1895, known as yellows commissioners, shall be uncertain as to the existence or nature of any infectious or contagious disease or dangerous insect pest, in an orchard or elsewhere, or in case any dispute shall arise between the owners and commissioners, it shall be the duty of said commissioners to notify the state inspector of orchards and nurseries."

Mr. Harris: He has no right to order that tree out—it is his duty to notify the state commissioner?

Mr. Morrill: That is the yellows law?

Mr. Graham: This section alludes to both yellows and scale. However, it is not an amendment, and does not affect that. "It shall be his duty to notify the state inspector of orchards and nurseries, who shall at once investigate or inquire into the matter," but where the commissioner is sure that the orchard is infected with yellows or any other disease, I do not think there would be a question of doubt of his authority to order or to take them out himself immediately. It is a question of where there is a dispute.

Mr. Harris: There generally is a dispute; that is, in a great many cases in a new country where we are following this, where people are not posted as to what these diseases are, and the commissioner comes along and orders them to take out a tree, and in the mind of the commissioner he may be satisfied it has a disease and in the mind of the owner it would not have. Now, would I as a commissioner have a right to order or force them out, or would I have to notify the state commissioner?

Mr. Graham: I think you would have a right to order it out.

Mr. Harris: On that section, it would be my duty to leave it to the state commissioner.

Mr. Graham: So it does, to report to him. I think if a tree had yellows it would be a very easy matter to convince the owner of the fact.

Mr. Harris: I don't know. I had some difficulty in that.

Mr. Morrill: There is one suggestion the gentleman ought to remember in regard to that, that might assist him some, that in case of dispute and you call on the state commissioner, if the local commissioner is right the owner is to pay the bill and it is collected from him on his next tax roll—all that expense goes to him, and that will help you in your business if you are acting as a yellows commissioner. If a man understands he can not raise a flimsy excuse without bearing the expense, he will very soon take out the tree.

Mr. Stevens: In answer to the gentleman, as to whether the commissioners are compelled to visit the orchards, the commissioners in Kent county have organized themselves into a little association of their own and we call ourselves the yellows commissioners. I am secretary of the association. We did so for our own benefit. We get our township boards to agree to pay our bills, and the commissioners are very anxious to earn the two dollars, so they do their duty. In fact, they have made inspection of nearly all the orchards in each township, and the townships have very freely paid the bills. In that way there is no compulsion about the matter, and the township commissioner gets paid for his work, he is anxious to do the work, the orchards are visited, and the result is we have done some good work. Yellows is practically cleaned out we think.

Mr. Harris: The reason I brought this question before Mr. Graham is this: I have been yellows commissioner, one of the commissioners, and while I am interested in the welfare of our township and I want every diseased tree eradicated, I do not want to put a bill upon the township which is not legal or which is not right, and I want to know whether this law compels us to go forth and examine these orchards and make this charge, because we can not work for nothing, exactly, and I want to know whether the law compels us to go forth and pass our judgment upon these, to see whether there were trees that must be taken out or whether we must do the best we can as it comes to our natural observation, and wait for other people to notify us. We wish to know whether it would be right or whether we would be justified in going forth and examining, and whether we are liable to a fine if we do not go forth and examine.

Mr. Stevens: A stitch in time saves nine. The gentleman can remember that each township would rather pay a bill of $25 or $30 for a commissioner to make inspection before it was too late, than to wait until somebody had made complaint that an orchard is infected with yellows and everybody else has yellows from the effects of the delay. I would say that the promptness with which we have acted has been beneficial.

Mr. Harris: Our board refused to appoint yellows commissioners until we compelled them to, until we put it directly before them and told them, "The law compels you to appoint yellows commissioners." They did that, but the board is not with us.

Mr. Lawton: I understand the yellows commissioners are compelled to visit the orchards. That is our understanding of the law and that is the way we have interpreted it.

Mr. Cook: I have had some experience in this line, and I am satisfied, and it is my experience always that the commissioners can not afford to neglect to visit places where they have any idea yellows or these other diseases exist, and in the city of Grand Rapids we have had commissioners a number of years in order to look after the city and protect the orchards surrounding it. We are all surrounded by peach orchards, and have many in the city, a large number of trees, and we have made a practice, and we have supposed that it was absolutely necessary, to visit every tree in the city; and if we had not done that the surrounding orchards would have been destroyed. We have followed that practice, and one season we took out over fifteen hundred trees in the city of Grand Rapids alone, affected with yellows, and a large number of cases of black-knot in plum, and also pear blight, and it could not have been reached by any other system than that of the commissioners visiting from city lot to city lot. We find isolated trees.

Mr. Harris: Do you have any trouble in getting your bills audited?

Mr. Cook: Not at all. No township can afford to refuse to audit the accounts of commissioners if they have the interest of the business at heart in their town. I have in mind a pretty prominent peach-grower who several years ago had yellows in his orchards. He was advised by the Grand River Valley Horticultural society that the only remedy was to take those out. He thought he could treat them; he had some remedy that somebody had come along and told him he could treat those trees with, and there was no use of taking those out. The result was he lost fifteen acres of his own orchard in two years, and destroyed all in west of him where the winds carried it. Inside of the city we ordered out six hundred trees that probably were destroyed by the neglect of this individual alone. It is comparatively free now, so far as we know.

Mr. Monroe: I think the question of Mr. Harris is not quite answered, if I understand it right. He wants to hit a case where the conditions are all unfavorable, where people are not inclined to do a thing except the law compels them to do it.

Mr. Graham: I have the law here: "It shall be the duty of the commissioners or any one of them, upon or without complaint, whenever it comes to their notice that either of the diseases known as yellows, etc., exist, or are supposed to exist, within the limits of their township, village, or city, to proceed without delay to examine the trees or fruit supposed to be infected."

Mr. Harris: Here is another matter. I am willing to go forth and do this work, but I must have the pay that is provided. The law says that the township shall audit my account, and if the board refuses to do it I can't get a dollar.

Mr. Monroe: There is plenty of machinery, as I understand it, to reach the township board when there is a provision of that kind.

Mr. Harris: The township board are not fruitgrowers and they do not consider this matter necessary.

Mr. Graham: I think the first board of commissioners appointed in the township in which I live, of which I was a member, examined every orchard in the township at that time. I think we did that two or three years. It was not very expensive, and the township board always audited the bills. I think the next board of yellows commissioners went at it in November or the first of December, and examined every orchard in the township, every tree. They put in some two or three weeks, I believe, examining orchards in November, and they got three dollars apiece per day for their services, examining trees for yellows after the leaves had gone and the fruit had gone and everything else. The next commissioners did not visit the orchards that time of year.

THE BUSINESS PART OF BERRY-GROWING.

BY MR. M. A. THAYER OF SPARTA, WIS.

There are certain principles that underlie and form the basis of all successful business. The right application of these principles make the successful merchant, banker, manufacturer, mechanic, professional man, and the successful berry-grower also.

The fruitgrower should combine the leading principles and practices of almost all other successful business. He should possess the tact and taste of the successful merchant in the selection and display and sale of his goods. He should imitate the banker in his attention to details and the absolute accuracy of his accounts; the successful manufacturer in the close economy of producing and selling his products; the mechanic in the skill and energy of his work, and the professional man in intellectual power and thought.

Berry-growing consists of a great number of details. At the same time it is a business requiring more skill and downright good common-sense than any other vocation in life.

The first step is an application of scientific knowledge to determine the constituent parts of the products to be grown, the elements of fertility in the soil, and the best method of supplying the same. Before building, manufacturing, or producing anything, we should understand the elements or materials that enter into its construction, and the amount of each.

We should appreciate the great difference in soils and their adaptability to growing certain crops. It is then our business to combine such elements and materials at the least cost and in the most perfect form for our use.

As water is the chief element in all fruits, we should most thoroughly understand its preservation for use of the plants by the various methods of preparing, mulching, and cultivating the soil.

The second step requires clear business judgment in selecting a location and its special adaptation of surroundings to our wants. Soil, slope, altitude, drainage, labor, shipping facilities, and markets are all elements that enter into successful fruitgrowing, which you can not safely overlook.

The gathering and packing of berries is of greatest importance, and the management of pickers on a large plantation requires considerable executive ability.

The selling of fruit to best advantage requires highest order of business talent, and fortunate is that community having a well-organized society with a good agent or board of directors by whom all products are disposed of either through reliable commission men or by direct shipments. This is especially true of small fruits. The absence of an organization for this purpose places upon the grower the greatest and most serious responsibility of the fruit business.

It is evident, from returns from sale of berries at the present time, that there is either a great over-production of the kind and quality placed on the market, or the transportation, handling, and distribution are defective. We must find the actual cause of the present unsatisfactory returns or we can not hope to remove the difficulty.

Study the question of markets, of distribution, select commission men of reputation and ability, and stick to them.

Above all, do not forget that in selecting a location, in the quality of soil, in cultivating, in mulching, in pruning, in picking, in packing, and in all the details of the work, you are performing an important part in selling your product. There is usually a demand for good fruit, delivered in good condition in the right market.

The third and most important is the grower himself. Is he honest, temperate, industrious? Has he a taste and liking for the business? Is he quick in perception and action? Is he orderly, systematic, and methodical? Is he courageous, confident, self-reliant, and determined? Is he well-informed and progressive? All these are elements that enter into the successful berry-grower, and each grower must answer for himself.

Let the X rays of fact be turned into his secret soul and let him there study himself, and decide without prejudice whether he can answer these questions in the affirmative. If not, then cultivate the weaker qualities, as he would the berries in his garden, until strong, firm, and complete. Having these principles well developed, he stands at the head of the most honorable business on earth.

In the division of labor it is his part to create the useful as well as the beautiful in life. The earth works for him, the sun and rain, the heat and the frost are as servants and respond to every application of intellect.

The fruitgrower should then adopt the most exacting business principles.

In this business there can be no delay. He must take the season when it serves, or lose his labor. Products must be placed upon the market without regard to conditions, competition, or prices. No other business requires such prompt, energetic action, and only the best preparations for all emergencies can secure complete success.

DISCUSSION.

Mr. Hancock: Mr. Thayer spoke of an association. I would like to have his ideas about it—an association for the distribution of fruit and for information, I understood him.

Mr. Thayer: I would state that in Sparta we have an association which is managed by a board of five directors. The form of the organization is that of a joint-stock concern. Each grower is entitled to one share. They are organized the same as any other association. We have some 150 members in the organization. There is a board of directors, elected by the association. They employ a clerk, book-keeper, etc., and all consigning of fruit is done by the board of directors. They limit the shipments to certain parties in certain cities. Our shipments are almost entirely to St. Paul, Minneapolis, Duluth, and West Superior, excepting as we get orders. We work up in all the smaller towns as many direct orders as possible. We reach all through the Dakotas and Minnesota and all the minor towns and work up special orders. Then the overplus, or the berries that are not quite up to standard, we ship to the commission houses. We use the commission house more for the overflow than any other purpose. The returns are made direct to the grower himself; but, mind you, the board of directors decides to whom the berries shall be shipped. Last season we limited the shipments to two or three of the best commission men in each city. One result was that, before the week was over, we had a dozen representatives of the other commission houses visit us to buy berries, and we sold them at good prices in that way. We decide to a certain extent to what point they shall go, whether to Minneapolis or St. Paul; still, the grower can decide, if he wishes, where he would prefer to have them shipped, but the business management is all done by the board of directors. By shipping the entire crop in that way we get a little rebate.

Mr. Barnett: Three per cent. is the usual rebate.

Mr. Thayer: That is right, and that three per cent. is redistributed, or is declared in a dividend at the close of the business, and this dividend is based on the amount of shipments made by each grower. Now, we have found that this is a very satisfactory way of handling fruit to the extent of our product. Whether it could be managed where you grow in such large quantities as you do in Michigan, I don't know. We have in and about Sparta something over 400 or 500 acres of strawberries, a hundred or two in blackberries, as many raspberries, and some in black and red currants, gooseberries, etc., and we have found that very satisfactory indeed. Before the organization, parties were shipping to everybody. We found our own berries coming into competition with each other. My neighbor would send to one commission man and I would send to another, they would go to St. Paul or Minneapolis; they would be placed out in direct competition with each other. Now, that was one thing we found it very beneficial to avoid. We have found it also very beneficial to have our consignments made to a few commission houses. Get a good one, stay by it from beginning to end, and you will find the commission men are pretty "square" as a rule.

Mr. Monroe: How are the officers of the association paid, those that do the work?

Mr. Thayer: The officers receive no pay. They have a secretary who is hired by the month and works under the direction of the board of directors.

Mr. Monroe: How is his compensation provided for?

Mr. Thayer: It is paid out of the membership, $2 per share. That gives the directors $300 and they calculate this will pay the clerk for the two months they use him, and will also pay for the correspondence and a little rent.

Mr. Monroe: A person who ships a thousand baskets pays no more than the man who ships ten, is that the idea?

Mr. Thayer: Yes, sir.

Mr. Monroe: The reason I thought that must be so is that the remittances are made direct to the growers, so it does not come to the association.

Mr. Thayer: No.

Mr. Monroe: So to that extent it is a mutual affair?

Mr. Thayer: It is a mutual affair all through.

Mr. Graham: Who decides where this fruit is to be shipped, where it is to go, the owner?

Mr. Thayer: The owner can do so if he wishes.

Mr. Kellogg: The board of directors simply do it by courtesy, they are not required to?

Mr. Thayer: The board of directors ship the fruit and direct where it shall go, unless the grower himself has a preference, but it must be shipped to certain commission houses—he is restricted to that. For instance, we sold to three commission men in St. Paul. The fruit must go to some one of these, all the berries from Sparta.

Mr. Graham: Suppose the grower says he wants it shipped somewhere else, to some other party, what then?

Mr. Thayer: Outside the association he can ship wherever he likes—by keeping outside of the association.

Mr. Graham: Can he ship part of his stuff outside and part in the association?

Mr. Thayer: Every member has a right to sell his own stuff at home if he likes.

Mr. Graham: If a consignment of berries did not bring him a satisfactory price through the association, would he have to ship to the same party tomorrow, or could he ship anywhere he saw fit?

Mr. Thayer: Yes, sir, I think so.

Mr. Graham: Then there is no controlling force there whatever?

Mr. Thayer: If you ship differently from the instructions of the board of directors you would be dropped from the association.

Mr. Graham: I do not understand it. I thought he had a right to sell individually.

Mr. Thayer: You can sell individually, but if you ship them on commission to St. Paul or Minneapolis, or any of those points which are designated by the board of directors—you have no right to do that, you have no right to put your berries in competition with those of the association.

Mr. Graham: You can put them anywhere else you see fit?

Mr. Thayer: You can put them anywhere else, you can ship them anywhere else you see fit. It is only to dispose of the large surplus. By doing that we charter special refrigerator cars, and this gives the smaller growers the benefit of the cheap rates of shipment, and it gives them also the benefit of the experience of the board of directors, who are supposed to be men of experience in that line; and it has worked very harmoniously, to the great satisfaction of both the large and small growers.

Mr. Kellogg: How long has the organization existed?

Mr. Thayer: It was formed two years ago. I wish to emphasize the remarks made by our president and those of Mr. Kellogg yesterday. You should have no false motions in growing fruit. When it is possible to make one motion and get a plant in and have it right, you should learn to make that motion, even if you have to practice a good while. You can not afford to grow poor plants, you can not afford to produce poor fruit, you can not afford to do anything in a loose and slovenly way in growing berries. I tell you, the trouble is not so much with the commission men; it is more with the people who are growing berries today. You can not afford to grow a whole lot of poor stuff that keeps prices down all the time. If there is an over production, let us find it out, and let us grow better berries. I tell you, much the greater part of the fruit placed on the market is poor in quality, is put up in poor shape, and it is put on the market in the worst of condition. There is no doubt about this. Here is a little matter about commission men. We say they are stealing us blind —some of us do. I used to think so, sometimes, but lately I am a friend of the commission man, and I will tell you how I changed my mind. We shipped berries to Minneapolis. At first we got large prices; in a few days the market would be clear down and we would get nothing, then a day or two it would get better. A great many men would say, "The commission men are getting the money and putting it into their pockets." I took the trouble to follow a shipment to Minneapolis, and stayed on the market without my own commission man knowing who I was or where I was from, and I found out this: that when berries arrived in good condition, good berries in clean packages, they brought a good price, and good returns were made to the growers. This was told by the shippers among their neighbors. Prices were so and so—they were clear up, in Minneapolis, and the growers went to work and shipped all the poor fruit they had with the good; if they had anything whatever they would say "That will bring a good price at Minneapolis, anyway". About the second or third day after that good report the commission men would be overloaded with all sorts of fruit in all sorts of packages and all sorts of conditions. The commission men would sell it for what they could get, perhaps not one half of what the reports showed before. They would make reports; instead of $1.60, they would make them 75 of 80 cents, just half the price. The returns would go back and the growers would say, "The commission man has taken fifty or sixty cents out of me some way; I won't ship there any more", and he would try perhaps Chicago or Milwaukee or some other point, and they all perhaps would do the same thing. In the meantime, berries became scarce again at Minneapolis and in the course of a week nice berries come in. The prices are up, good prices are returned, so they try Minneapolis, but try some other commission man, and the result is just the same. This repeats itself over and over. I have seen berries as fine as you ever saw go in there; they were packed nicely, but on account of the weather or something of that kind, or getting in there late they sold low. Now here is a point. The berries that reach these points at six o'clock in the morning, or before seven, are worth from 25 to 40 cents per case more than the berries that reach there at eight or nine o'clock. I have seen that time and time again. I tell you, you must have good fruit, you must have it in good packages, you must have it on the market promptly on time, and then you are all right—you will get something for it, I believe.

A Member: And send it to an honest commission man.

Mr. Thayer: Of course, that is essential.

Mr. Rork: How do you prepare your ground for planting?

Mr. Thayer: Well, I prepare it by putting on all the fertilizer I can afford to, all I can gather in there. I use nothing but barnyard manure and ashes. I use that very freely; and if I can, I precede the crop with potatoes or some such crop.

Mr. Kellogg: Do you put ashes on after you set the plants, or before?

Mr. Thayer: I put it on afterward, generally. In our town we have no large manufactories from which I can get ashes, so I made a lot of galvanized-iron barrels and placed them around at every house and store and hotel that had two wood stoves or more, and then I sent teams around every ten days to empty the barrels and in that way get a supply of first-class ashes.

Mr. Rork: Do you ever prepare by sowing clover?

Mr. Thayer: Yes, sir, I do that just as often as I can. I think it is one of the best preparations. If I could always arrange it I would grow clover, plow that under and grow potatoes, and follow with strawberries. I think that is one of the best combinations I can get. If I can not do that I sometimes sow winter rye, late rye, and plow it under in the spring.

Mr. Kellogg: I would put the ashes on with the potatoes, though.

Mr. Thayer: Yes, sir.

The President: How many crops do you take from a planting?

Mr. Thayer: I used to advocate only one crop, but I have changed my mind. In our section we have had drouths and various things to interfere with us the last three or four years, and I find this year I have the best crop I have ever had from a second crop. So I make this rule: If I have one very large crop I will plow under; but if from drouth or any other reason I have a light crop the first year, then I will keep it as clean as I can during the summer, and with a little work reduce the rows in the fall, and try it another year, and perhaps the third year. I think often the second and third crops are made to be as good as the first.

Mr. Kellogg: Do you practice burning over your plantation?

Mr. Thayer: Yes, sir, immediately after the fruiting. Sometimes I follow the pickers right up, I cut the vines all off, leave them there a few days, and with mulch on put the fire in and burn them over completely.

The President: You speak about getting a berry crop the first and second or third year sometimes. Doesn't the variety have considerable to do with that?

Mr. Thayer: Possibly it would. If I had my ideal way of growing strawberries I would, as fast as the runners came out, fasten them down and give them root just as soon as I could until they covered the ground, all that I wanted. Then I would go through and remove every runner after that, but this is hardly practicable for most fruitgrowers. The theory is all right, but we do not practice it. We are not thorough enough in the business.

The President: In consideration of the fact that the acreage is so large and the crop is so large, wouldn't you advise that ideal method of cultivation as the only way to make any money out of it today? Can you see any better way to do than to reduce the acreage and improve the quality by cultivation?

Mr. Thayer: I think that is the keynote to the situation today—less acreage and better product. Then follow out your distribution, get that down to system. We must devise means by which we can plant and grow our crop with the least possible expense and with the highest regard for quality and best method of shipment. That is all there is to it. We must get right down to fractions on everything of this kind. We can not make a false motion, as Mr. Kellogg told you yesterday. I don't care whether it is planting, picking, packing, or selling—you must not have a false motion in the whole thing.

PROMISING NEW STRAWBERRIES.

BY PROF. L. R. TAFT, AGRICULTURAL COLLEGE.

I regret that I can not give you more on this point today; but, so far as results of this year are concerned, I have been away a number of days now and have not had a very good chance to watch. However, that is being done for you. Mr. Gladden, who has looked after most of that work the last few years, has been engaged upon it, so that even though I have not been able myself to follow through the crop this year, you will by and by get a full report of the varieties; and I want to say as most of you know, we are testing at the college something like 200 varieties of strawberry, including all the new ones and many seedlings, of which only a small percentage are of much value, and we also have at South Haven about as large a collection, grown in a similar way, and we have set out in other parts of the state some of the more promising sorts in the collection, so that they will be pretty thoroughly tested.

The topic as put down, I see, is "Promising New Strawberries"; and in the few minutes I shall talk I will merely run over hastily some of the merits and demerits of the kinds with which we have been most pleased, of the newer ones, and I will not attempt to say much of anything about the older and for ordinary planting the more valuable kinds.

As our berries came into fruitage this year, of course we carefully watched them, and at the opening of the season it looked as though the kinds that are now being introduced, and in fact have been somewhat introduced, as Clyde and Cyclone, gave perhaps the most promising appearance, so far as growth and health of the plant and promise of a crop were concerned. This Cyclone, of which I see there is a plate here (and which, by the way, is entered as one of the market sorts, and as you will see by and by it will receive the award), is certainly with us a very promising kind. It has good color and is very firm; it will stand more handling than most of the other sorts, and it has been very healthy and quite prolific. Up to the time I left home I thought it one of our best kinds.

The President: What is its season of ripening?

Prof. Taft: It was the first to ripen this year. The first berries were picked from this kind. Last year it was not so early.

Clyde has been grown with us something like six or seven years, and for a number of years it made a very good showing, and then there was a year or two it was not quite so good. Last year it was one of the best kinds, and, although at first this season it was one of the very best, during the last few days it did not show quite so well—that is, up to Tuesday. I have not been there at all since Tuesday.

Then we have other new sorts, including one or two Michigan seedlings that I wish merely to mention here so that you can keep a little watch of them. They were both from Berrien county; in fact, I think both are from Bridgman or near there. One was sent to Mr. R. J. Stahelin and we have called it Fred Stahelin. It is certainly a very promising kind for at least local markets. This variety is very much like Cyclone except it is not so firm. It has a somewhat bright color, is a good growing plant, and usually very productive and of good quality.

The other kind that I mentioned as being of Michigan origin is from a man named Kyle. It is named Kyle No. 1 and is from Berrien county. It is quite productive, is a very firm variety, and I think it would do well for market purposes.

We have another kind, Anna Kennedy. It was planted last year for the first time, and that also seems very promising.

Among other kinds that show somewhat differently from these, and which have been very highly praised, is Arrow, and this is a variety that is somewhat extended in bearing, even more so than Cyclone, and it also seems very productive, but the color is perhaps a little too dark. I could hardly tell at the time I looked at it last, but it seemed almost as dark, for instance, as this one I have here, Leader, which is a little too dark, perhaps, for market.

Another variety that has shown very well and comes in at about the same season, is a kind from Kansas known as Apache. This stands next to Cyclone and one or two of the older kinds, and is the most productive kind we have had of these new sorts. It is of a light color, the berries are not very large, but of good fair size.

Of the larger sorts, the variety known as Enormous has perhaps attracted attention as much as anything else. This is a variety that, so far as its size goes, is rather larger than Marshall, and with us is more regular and a better variety. Speaking of Marshall, I see it is exhibited here and that there is also a very fine crate here of the variety. I would say that it is a valuable sort in many places; but, as I have been around the state during the last week or so, I find it is only here and there that it is of any value; and, as has been proved way back in its old home, Massachusetts, and in most places here, drouth or leaf-blight will so weaken the plant that it does not develop its fruit properly, and this year our crop of this kind is almost a failure.

The Secretary: Did you do anything to counteract blight? Will spraying do it?

Prof. Taft: Spraying will largely keep it in control.

Mr. Rork: Is it not also very susceptible to winter's cold and early frosts, killing the buds?

Prof. Taft: I have not seen anything of that; no, sir. I should think it would be, from the nature of the plant, but I have not noticed anything of it; in fact, I saw no harm to any variety this year or last. Of course, the previous year all our plants were injured in that way.

Another kind that is also promising is Sunnyside, also coming from Massachusetts. This is a large variety with a very good plant. I think it certainly is well worthy of being placed among the promising new kinds.

We come then to two other kinds that are something alike and yet different, Mary and Glen Mary. They are both large varieties, and where one has a liking for large fruit I think they are certainly of much promise.

Another kind that we are testing, that could have been mentioned with the others of medium size and of somewhat conical form, is a seedling from a large plant-grower of Virginia, M. T. Thompson, which is called Thompson 40. We have tested a large number of his seedlings and this is perhaps the best of all. It certainly is a very healthy, productive variety, and is, I think, worthy of trial.

Another one with which we have been much pleased for several years, of medium size, is Charlie. It is one of the healthiest of all we have, and it makes all the plants it should. It is not excessive in that respect, and it has proven very productive, and for a local market it is a good berry. It is not nearly so firm as Cyclone, but it will do all right for the local market and for home use. The quality is fair and its regular form and bright red color would make it of value.

Of the smaller producers, but valuable for home use, where you wish appearance and quality and color, would be Purdue. The berries are even in form, of good size, very regular, and of a very handsome color.

Ideal, a kind sent out last year by Mr. Crawford, is of much the same appearance, but it does not seem quite so productive. The berries have all the good characteristics of Purdue, and I think, for a berry where one wants the very best, the Ideal is truly named.

Another kind I see exhibited here, that would hardly be classed among the new sorts, is Brandywine. This has been fruited at least four years by us, and without exception it has shown much value. It is generally of good size and shape, and of a color as high as it should be, the plants are healthy, and they have each year borne good crops. I have nothing but good words to say of Brandywine.

Greenville, a little older kind, is not perhaps quite up to its record of previous years, but in many sections it has been well tested and has proven to be of a good deal of value for the local market. It is not quite firm enough to ship well. Of course, of the older sorts, Haverland is a productive variety, and, although it seems soft, ships fairly well. Bubach is another of those kinds for home use, and on strong soils with good care, it is quite productive.

Parker Earle, of which I see a plate here, is oftentimes a very good sort, but I would not recommend its general cultivation on a large scale, unless one has strong soil and gives it the very best care.

Mr. Kellogg: Or muck.

Prof. Taft: I call that a strong soil. It will not do well on sand. I think it is unwise for a person to use too many of these varieties. As a rule, perhaps three or four would be all one could grow with profit, and yet, from the fact that the older kinds gradually seem to weaken so that they are unproductive, I think it is desirable for any one in the commercial growing of strawberries to try to keep well up with the newer sorts and learn their value on his own ground. While we are having them tested as much as possible, to learn their value in other parts of the state, I find that with people a few miles away, with different soil and perhaps different care, the same varieties in one case may be of much value, and in the other they fail, so that in order to be posted as to the kinds that one can put out, profitably, I think one should try each year some of these newer sorts that have been tested and are generally profitable and be able to select properly from them. Of course, we have many other kinds, but I have picked these out as seeming to be among the most promising.

DISCUSSION.

Mr. Rork: Could you give me the season of ripening of Sunnyside?

Prof. Taft: That is about medium, coming in this year about four or five days after Cyclone. Ours came all in a bunch, this year, so I can hardly tell. It was not over six or seven days from the time we had our first ones until the last ones were ripe.

Mr. Kellogg: I wish to suggest that this year we are all at sea as to varieties. I had over a hundred varieties to test and the cold weather seemed to keep them back, but they all caught up and came in a huddle. But Sunnyside is one of the latest berries and one of the most productive we have and it is a grand companion to Kennedy.

Mr. Rork: I would like to ask if you are testing Margaret?

Prof. Taft: Yes, sir.

Mr. Rork: How do you find it?

Prof. Taft: I could hardly judge from the plant. It came to us late last year, and it happened to be when the weather was very hot and dry, but from the few plants we have carried through, and the appearance of the fruit up to this time, I think it is a very good kind. We have not had a chance to test it thoroughly.

Mr. Kellogg: I should call Margaret an improved Brandywine.

Mr. Rork: Did it ripen with Brandywine?

Mr. Kellogg: Yes, sir, about the same season. I have not seen a berry in many years that has pleased me so well as that.

The President: I would like to ask Prof. Taft if among these new varieties he has discovered anything he thinks is better for market than, we will say, Warfield an Bubach and Lovett—that class of berries that we have tested years.

Prof. Taft: Nothing that I should put in above those half dozen kinds which we all know are good, except, as I said before, I think that some of these kinds, in certain locations, will be of more value than some of the others, and I would advise the testing of a few of the kinds I have mentioned as being very promising. At the time I came away we were keeping a careful watch of these; and among those I have mentioned, Cyclone was way up at the head. Another one I should have mentioned, but passed over, is Bisel, which showed up well. Haverland, Cyclone, and Bisel were at the very head. These is no great difference in those three kinds. Another kind which is very seldom catalogued, but which we have grown for years and have always found productive, is Leroy. This is of good color, productive, has a good growing plant, and is a good shipper.

Mr. Harris: What would you recommend as a variety for yield, color, and quality after canned or preserved?

Prof. Taft: Perhaps I should not choose it from our own results, so far as the yield goes, but Lovett does very well, I think, for canning or anything like that.

Mr. Harris: How about Warfield?

Prof. Taft: Warfield, so far as yield goes, I would put at the head in our experience.

Mr. Harris: And quality?

Prof. Taft: The quality is good. Warfield is one of our most valuable sorts.

A Member: I would suggest, in pushing Warfield to the front, there are some soils in which it does not root well in a bad, dry season.

The President: It does not root deeply on any soil.

Prof. Taft: That is the objection to Warfield.

Mr. Kellogg: If you will take the old Crescent you will get about as good results as from anything you have mentioned, for productiveness.

Mr. Harris: Is the quality in Crescent?

Mr. Kellogg: No. Keep them thinned out and not let them mat and they will do well.

Mr. Thayer: Warfield is the best canning berry grown, I think, but don't allow it to get too thick, and then mulch it heavily. If you can guard it against drouth it is the best berry that is grown.

Mr. Harris: I have both muck and sand.

Mr. Thayer: I would not put Warfield on muck.

Mr. Harris: Will it do on damp sand?

Mr. Thayer: Yes, sir, I think so.

Mr. Rork: Mr. Thayer speaks of muck. We have acres of land that never become dry when in strawberries.

Mr. Thayer: Then Warfield is all right.

Mr. Harris: Mr. Thayer, you speak of using clean straw as a mulch. Do you think it would be of any benefit to cut the straw?

Mr. Thayer: I do not think it would be of any benefit.

Mr. Harris: Wouldn't it handle easier?

Mr. Thayer: No, I don't think it would handle as easily. I put the mulch on in the fall; that is the time to mulch strawberries—then you protect them in winter and summer both.

The President: If the gentleman has an idea that cut straw is all right, those who have tried it find that after the first heavy storm it has all gone right down into one place, so you should be a little careful about that. There are two requirements for a canning berry. To be real good it should have considerable tartness, to be balanced with sugar, and the other is that it should be red and firm throughout. Warfield and Lovett come pretty near filling those conditions, and the old Wilson does where you can grow it.

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FLOWERS FOR THE GARDEN.

BY MRS. EVELYN ARNOLD OF GRAND RAPIDS.

We hold there is nothing in nature the study of which will not elevate one. To become well acquainted with the habits of even a few plants affords so much pleasure that we become desirous of broadening our ideas by continuing the study for the amusement and knowledge to be gained. In fact, there are many who can obtain more unalloyed pleasure in this than in any other way, and can attribute their almost perfect health to this outdoor work.

The best results are obtained only by commencing right and in growing plants suitable to their environment. Plants that thrive only in the sun are too often planted in the shade, and vice versa. As a rule, it requires sunshine to produce bloom and perfume. Flowers will grow for anyone who will give them a fair chance, and they grow for the flower-lover because he does give them a chance. It would appear incredible to a novice, the amount of plants that can be grown on even one rod of ground, as the result of careful selection, proper watering, and feeding. A few carefully selected, well-grown plants, produce a far more pleasing effect, than mixed, ill-assorted plants ever can.

During these golden days of summer is an excellent time to take notes of what we wish and what we do not wish to grow, making a list of everything we think we would like to grow, and then weeding out the list, as it were, so that it will fit the space one has to occupy. It requires time and much forethought to obtain the much-desired results. After the fruits and vegetables are selected, come the flowers. To be sure, we can not eat them, but we can look at them long after the eating is forgotten. Most of us make the grave mistake of trying to grow too many kinds rather than taking better care of what we already possess. While novelties are a necessity, to improve the race of plants, most of them must be handled carefully, as they somewhat resemble lottery tickets—more blanks than prizes.

Make it a study to grow flowers with long stems, that are free-blooming, and those that keep well. Fragrant flowers are always favorites. To produce a succession of bloom the whole summer long, spring bulbs, summer annuals, perennials, and hardy shrubs are necessary; and the day you make your selection is the day you pick your flowers, so to speak. To make the garden gay in spring, crocuses, "little harbingers of spring," bloom first, followed by hyacinths and then by tulips. Spring bulbs increase from year to year and are a good investment, planted in October and transplanted about once in two years. Pansies (and who does not love the darling pansy?) bloom from earliest spring to latest autumn. For rich and varied coloring they are unexcelled. Among the most desirable summer annuals are sweet peas, the new, large-flowering kinds. Although there are more than a hundred named varieties, we believe the best to be Blanche Ferry, pink and white; Katherine Tracy, extra fine, shell pink; Lady Penzance, orange pink; Mrs. Sankey and Blanche Burpee, whites; Countess of

Radnor, lavender; Lottie Eckford, white blue-edged; Cardinal, scarlet; Boreatton, maroon; Aurora, striped, large and fine.

The best is the cheapest. The seed is now so cheap one can not afford to plant the poor sorts. Cultural directions for growing sweet peas improve each year. The latest is, plant them in hard, rich soil, two inches deep, punched in with a hardwood stick made similar to a lead pencil. This gives a light covering for each seed, yet leaves the rest of the ground hard. If planted in loose, rich, light soil, they run too much to vines. Spray the vines every day or two with water, to keep in check the red spider. Remove all seed pods, to prolong flowering. Be sure to give all tendrils support. Side shoots retard flowering, if they do not prevent it entirely. Sweet peas grow better in soil not before used for peas. They are the most in favor at present, of all summer annuals.

The new Branching aster, with its large blooms and long stems, resembling early chrysanthemums, promises to supersede all the old and valued varieties. The colors at present are shell-pink, rose-pink, white, and lavender, the shell-pink being the hardiest and most sought.

The selected tall nasturtiums are good climbers, easily grown from seed, and are more fond of water than of rich soil.

Tons of mignonette seed are sold every year in London. To possess fragrance, mignonette must be grown in poor soil, and it is impatient of too much water. It is really a weed.

Iceland poppies are among the very best new flowers—of recent introduction, blooming from seed the first year, wintering without covering, and blooming profusely the second and third years. Picked when they first open, in cool weather, they will last a week, and are, I think, the aristocracy of the poppy family.

There is a growing taste for perennials, but, as the list of them is large and the space around the home plat limited, care must be used to select only those that will be of permanent value. The newer hardy phloxes are excellent, as also are pansies, lilies, garden pinks, wild ferns, early chrysanthemums, gaillardia, double perennial sunflowers, irises, violets, etc.

There is a fashion in flowers, the same as in other things. Those that were all the rage a few years ago are replaced by some of the improved new sorts. The once popular verbena is now seldom seen.

This year, shrubs, always in favor, are quite the fashion. Some of the very best are altheas, double white, double rose, and single white. They make stately, handsome, permanent shrubs, and are quite hardy. Spirea Von Houttei is being much sought after. Hardy hydrangeas are most favored by some. The sweet syringa is just now in full bloom. Tartarian honeysuckle is fine, blooming usually at Memorial Day.

Growing a few bulbs, annuals, perennials, and shrubs, about the home plat will bring us all much pleasure and more good health. It is not too early to begin now to improve our list of plants.

A HORTICULTURAL TRINITY—CARNATIONS, CELERY, TOMATOES.

BY MR. J. G. HANCOCK OF GRAND HAVEN.

This paper must in a measure be the history of a private business enterprise, but we trust it will be of benefit to some, and will show in some degree how the three articles, celery, carnations, and tomatoes, have increased in cultivation in this locality.

About twenty-three years ago the first celery was grown for market in this part of the state. The first crop consisted of about 600 plants, for which market could scarcely be found. But the demand increased in proportion to the supply, and our citizens came to consider almost as a necessity what, at first, they either knew little about or considered a luxury. So great has been the increase that from the beginning of 600 plants, twenty-three years ago, last year there were about seventy-five growers in this vicinity who devoted the greater part of their time to cultivation of celery, and the output for last season was well up into the millions of plants; and I have been credibly informed that the shipments by boat, to Chicago alone, last year, were over 40,000 cases.

As to varieties, the first plantings were of such kinds as London Red, Giant White, and Turner's Incomparable Dwarf White. Then followed Boston Market, later Crawford's Half-Dwarf and Henderson's Dwarf White. These in turn gave way to the shorter and stockier growing kinds, until, at this time, about the only kinds to be found growing in this vicinity are the White Plume and Golden Dwarf.

While the change in varieties has been going on, there has been as marked a change in methods of culture. The old method of digging a trench twelve to fifteen inches in width and depth, and filling it half full of stable manure, is not considered necessary, for with the changing of the old so-called giant varieties to the dwarfer sorts the change was also made to the level system of planting, and instead of placing the fertilizer deep in the trench, beyond the reach of air and light, it is now plowed in and thoroughly incorporated with the soil, but near enough to the surface to be reached by the roots of the plants, and where it will receive the benefit of the air and warming influence of the sun, both of which are essential to perfect root action and plant development.

Celery is a gross feeder and requires heavy fertilization to get the best results. It must grow very fast in order to get crisp stalks, and therefore rather damp and rich soil is best adapted to its development. Another essential point that must be taken into consideration is that of climate. Celery is a native of England, and seems to do best in a cool, moist atmosphere. In this particular we are very favorably situated along the shore of lake Michigan, and I believe that to this fact of moist atmosphere and damp, cool nights, is due in a great measure the reputation that Michigan celery has attained for superior quality and flavor.

The method of bleaching has also greatly changed, and whereas it was formerly considered absolutely necessary to bank with earth, boards are now used very extensively for bleaching. Both methods have their advantages and disadvantages. For very early and very late celery, the old method would seem the best, though the use of the more compact and so-called self-bleaching varieties make the work of banking very much less than with the older and taller growing kinds. The advantages of bleaching by boards are numerous, but there are some disadvantages. The first cost of the lumber is quite an item, and then the labor of hauling is not much less than the labor of banking with earth. But in the hot summer days the celery will not be so likely to rust, and will be superior in appearance and flavor. The greatest advantage in board-bleaching is that it gives a greater range of soil on which celery can be successfully grown. The essential requirements are a rich, open soil, highly fertilized, plenty of moisture in the soil, and a damp atmosphere. Given these conditions, and the young plants set out five to six inches apart in a row, and the rows three and one half to four feet apart, and by constant attention to keeping the weeds out, and the soil loose and the earth banked up, or boards put on as the plants require it, we may have in about eight weeks celery that is a delight to the eye and delicious to the taste.

So much for growing celery. Now we come to the successful marketing, which so far is an unsolved problem. The method usually employed has been to ship by boat or express, and consign to commission dealers in the larger cities. For various reasons this has not proved a very great financial success, and it seems necessary to make some kind of change, and the solution may be in the central packing-house system as adapted to fruit. I understand this method as applied to celery is in successful operation in Ohio.

I have tried to take you through the various stages of celery-growing and marketing, and have reached the final disposition of it, the eating part. Perhaps you are not all aware that celery is delicious cooked and served in milk, the same as asparagus. Its medicinal properties make it particularly valuable as a nerve food. In some places the canning and pickling of celery is getting to be quite an industry.

The history of the carnation goes back over 2,000 years. It is hardly necessary to say we shall not attempt to give it in full. Books enumerate about 200 species, some of which are known as troublesome weeds, in many sections, the common chick-weed being one variety. Of the 200 species, only four are of value to florists. One of these is known as Sweet William, another Pheasant-Eye Pink, Bunch pink, etc. The species to which our modern carnation belongs is Dianthus caryophyllus, so-called because of its fragrance which resembles the clove spice of commerce.

The word dianthus is from two Greek words, dios, meaning divine, and anthos, a flower. If the pink in its original primitive simplicity was worthy the Greek name of dio-anthos, the grand evolved carnation of today more than merits to be crowned the "divine flower", "The sweetest smile of nature."

In the early stages of carnation culture the flowers were nearly all single and very small. But by cultivation and the systematic selection of the best specimens, the number of petals and the size of the flower have been wonderfully increased. It is often said that we attain better results when we keep an ideal flower before us. A few years ago John Thorp, a leading carnation-grower of New York, and later superintendent of the floral department of the World's Fair, said that the ideal carnation should be four inches in diameter and borne on a stem as thick as a lead pencil, which should hold the flower perfectly erect. While the carnation has not yet reached these dimensions in general cultivation, yet some specimens have been grown which have reached this size. The range in color of carnations is greater than in almost any other flower, ranging all through the various shades from the most delicate pink to the deepest crimson; also in pure white, yellow, and purple. Besides the self-colors, carnations are often most beautifully variegated with delicate penciling and shading.

The carnation has rapidly grown in public favor, a close rival of the rose, and often preferred to that popular flower for its wonderful keeping qualities. Carnations require a cool, moist atmosphere, therefore seldom succeed as house plants, though many kinds do nicely for garden planting.

Tomatoes, which were grown a few years ago only as an ornament, and called "love apples," have now become one of the chief vegetables of commerce. The list of varieties is very great, and the old kinds are constantly giving way to the new varieties. The leading varieties of a few years ago, such as Trophy, Feejee, and Canada Victor, are now seldom grown, though some seedsmen still catalogue them, and they are no doubt grown in private gardens to some extent. Perhaps the most generally cultivated varieties at the present time are Early Ruby or Atlantic Prize, Acme, Dwarf Champion, Early Michigan, New Fortune, Stone, Ignotum, etc., though there are other kinds that are favorites in certain localities. The method of planting and growing is very simple, as the tomato is one of the easiest of all vegetables to grow. For early market, the seed should be planted about the last of March, in a bench in the greenhouse, in hot-beds or in boxes where they can be kept warm and protected from the cold, changeable weather, for if there is anything that will injure tomato plants quickly it is cold weather or frost. The plants should be set in the field as soon as all danger from frost is over. They should be planted three to five feet apart, according to the richness of the soil, the richer the soil the further apart. In field culture, cultivation should be kept going both ways and the plants free from weeds.

This completes the method of growing, and all that remains to be done is to gather the tomatoes, and if possible sell them so as to get some money out of them. This latter is perhaps the hardest of all to do.

REGULATING THE COMMISSION MERCHANT.

Some time previous to this meeting, the society at Grand Haven had adopted a resolution calling for appointment of inspectors, by the federal government, whose duty should be to investigate the standing and methods of business of produce commission merchants, to receive and report upon complaints of unfair or unsatisfactory treatment of consignors, and in general to see that commission merchants do business honestly. It proposed that these inspectors should "Look into and examine the farm produce commission business with the same care and object in view that bank examiners do in their several districts."

Relating to the general subject (and several others), Mr. Enno J. Pruim of Spring Lake read a paper. Mr. J. G. Hancock followed with the resolution in full, when the subjoined debate ensued:

Mr. Hancock: I believe that it is the experience of most of the shippers of fruit that some such regulation is necessary. I believe that every honest commission man (and I think most of them will acknowledge it) can find no ground for complaint if such a law shall be passed and enforced. I believe that the conditions of trade demand something of this kind. There are, I understand, somewhere in the neighborhood of ten thousand commission merchants in the United States (I do not know as to the exact figures, but I believe somewhere in that neighborhood). The producer ships his goods—they are his goods, they are at no time the goods of the commission man—and I believe that he should have an opportunity to know what becomes of the fruit, and that this government should create a commission, having as much authority as the bank examiners have, and those examiners should be authorized, if it seems desirable in any case, to go to a commission merchant and ask him what he did with certain consignments, who he sold them to, what he got for them. I believe it is simply a matter of justice. I do not believe there is a man here who wishes to do another man an injustice in this particular. That is what the resolution calls for, and we should be entitled to it. I will leave it to you, gentlemen, but I think it should require very little argument to convince you that such a resolution is necessary, and I believe that this society should endorse this resolution; it should do all it can to have such an act passed and have it enforced.

Mr. Morrill: It appears to me, on such short notice, that there are a good many good features in this matter. The State Horticultural society is asked to endorse it. The society is usually very careful as to what action they take in these matters. They have a legislative committee to whom is referred all state legislation, but this is simply an appeal to congress, if I understand the matter right, because it is something that state legislation can not reach. I hope we will get a good expression, but when it comes to a vote we will ask that members of the State society pledge the State society. This is something we have to be a little careful about.

Mr. Geo. W. Barnett of Chicago: Just previous to adjournment yesterday, Mr. Pruim read his paper on "Mutual interests of horticulturists and business men." In that paper he made an assertion, if my memory serves me right, stating in plain terms, that the produce commission men of Chicago, and the National League of commission men were banded together against the interests of the producer. That is my recollection. Reference was made yesterday to a letter from the president of the National League of commission merchants. In the discussion it was claimed that that letter pledged that organization to oppose such legislation; at least, the construction given to the letter was that the organization would work against such legislation. Now then, in the absence of the recognized head, I champion the cause of the National League of commission merchants, in order that no stain shall rest upon 250 men who are absent. * * * * I helped in the organization. The first president was Walter Phelps of New York; the second president I had the honor to be. Disability on the part of the president the first year made me practically the executive officer. I watched it, followed its course throughout, and I say to you that not one single charge of dishonesty has been proven against a single member of the organization. We stand ready to meet every charge backed up with reasonable proof, and any man who can not show a clean record is shown the door so quick that he doesn't know what hit him. We stand on that platform today. The interests of the producer and the commission merchant are identical. The honest commission merchant must live by these shipments that he receives, so far as they will go. In this day and age of the world we must supplement that by merchandising. There are men here who sell by the car-load to commission merchants, and they must merchandise during five months of the year or they would starve to death. They accumulate—this is the statement. True, they do. A man who is in business thirty years ought to accumulate some thousands; but I say to you that today there is not profit enough in it to induce a man to go into the commission business if he was out of it, if he had experience and knew just what there was in it. The peach crop of last year has been the sore spot, and justly so, with the men who grew it. I do not minimize their efforts, I do not belittle their work, I do not slight the endeavors they have put forth to produce something that shall bring them something to live on until another crop; but the actual money received by the reputable commission merchant for handling that crop of peaches did not pay current expenses. While the remark may be made, "you are no worse off than other people, because we didn't get anything", still, in order to properly handle the business we must secure expensive locations, we must hire expensive help; we could not discharge those men, we could not vacate that store; with a dropping off of the receipts, our expenses would have to go on, and I know of at least one house, and I believe there were others, last year, that were handling the peach and apple crop, which was so disastrous to the state of Michigan, who lost thousands of dollars in the simple matter of expenses. Sell apples at sixty cents per barrel—what is there in it? Only six cents, if you get your full ten per cent. commission. That is all, and you can not put a barrel of apples into the house and take it out for six cents; it is simply an impossibility. Nine cents per basket for grapes! Nine tenths of a cent, if you please. Three per cent. of that, which is the invariable rule, I believe, goes to local agents or others, or rebates to societies. After an experience of thirty years on the market in Chicago I do not know of ten men who have retired on a competence, who have had the respect of the community. The great profits in the commission business are not so apparent. I have known of scores dropping out by the way, who have lost from five to ten thousand dollars that they put into the business, because it does not take a great while to eat up the capital. Now, I have stated these facts briefly, but I have tried to do it so clearly that there can be no mistake about it. I am speaking only of the honest commission man, I am only speaking of those who do their duty. It is only by the vast amount of business done, and, as Mr. Thayer so aptly stated, by looking after the fractions, that the profit is made. I have the honor of being at the head of a pretty large concern, but the amount we receive from our business is so small, the percentage is so small, that you have to do an immense business to make anything. For years our net profit, out of which had to come the sustenance of my brother and myself, was less than two per cent. of the amount of business we did; consequently we can hardly be accused in a wholesale way of being so great at "gouging"—I know no other word to put in. I was over at a factory today—and that brings up two or three remarks that were made. Mr. Kellogg says you must not make an extra motion, and Mr. Thayer has broached the same idea. We must keep step with time or we will be left. Chicago is in a great hurry—and why? It is rush and hurry with the crowd or you will be run over and crippled; and if you are crippled you are no good. I was over in this factory today, and I brought away with me a card. I stood by a machine, and a young man, scarcely twenty I should suppose, put on this edge at the rate of four thousand per day. I stood by another machine that cut it out square, without this beveling, and he makes over four thousand covers per day. I asked the proprietor how many he could do by hand, and he said a hundred per day would be a good day's work, but here is a young man who turns out four thousand per day. What is the lesson? It must be that in fruit-raising, in fruit-handling, in every department of business, we must keep step with the spirit of the age or fall behind. Let me now pay my respects to the dishonest commission men—they exist. They are dishonest, we know it, but I would not undertake to prove it. I would get a libel suit on my hands right lively if I should say "John Brown was dishonest and swindled", unless I had it in black and white to prove it. Who is going to prove it? The National League of commission merchants say, "We will lend you our help." While I was president of that organization I sat in my office and listened to charges made by one of the best attorneys in the city of Chicago against a firm whose name, for obvious reasons, I do not mention. The secretary, however knows it.

The Secretary: Have you any objection to my stating it?

Mr. Barnett: They are out of business; I do not wish to mention it unless it is necessary. That attorney was at his wits' ends. Said he, "Here, it is plain enough. But how are you going to prove it?" I detailed a man whom I was paying $2,000 per year (and he was earning his money), told him what to do, where to go, and he gathered the evidence. Shippers came in and said, "Mr. Barnett, you are a member of the National League?" "Yes, sir." "Well, so and so robbed me out of $500"—in one case $1,500. "Well," I said, "I am sorry for you." "Well, but I want to get my money back." "Who is your attorney?" "Do you have to hire an attorney?" "Yes, I can not appear in court." I said, "Gather your evidence, be sure you are right." He stated his case, and those cases were worked up. One man received back through the agency of the National League of commission merchants, backed up by Barnett Brothers, or

Barnett Brothers acting as part of it, $1,500, and inside of two months $3,800 were paid back to shippers by this institution which was vilified yesterday. Now you say, "Why do you not do it all around?" We are not a collection agency. It remains with you, gentlemen, who grow the fruit, who produce the fruit, to crush these men out, and if you will not do it, then what can you expect us to do? Suppose John Brown is a dishonest man and he will keep 25, 50, or 100 per cent. of the proceeds—in fact, he takes the whole business without saying anything to you about it. He has had the profit. Now, remember all honest commission men are not in this organization; we do not claim that. We said "come in with us", but there are men who stayed outside for very good and sufficient reasons, by themselves. The dishonest man has had the honest proceeds. Assuming you sell him a thousand dollars' worth of goods, and he is entitled to a hundred dollars of that, he has that and he puts that in his pocket, and with it includes from two to five and possibly nine hundred dollars. He has that money in his pocket. What does he do? He says, "What are you going to do about it?" That is in plain language, but I was told that in my office by an attorney, and the attorney said, "If any of your friends are in trouble, why, here is my card." Well, I did not need his card. I knew where to find his office. I considered it a downright insult, and that man I know is hired by the year to keep men out of trouble. Now, our local organization got after this concern that made these large restitutions of which I spoke. We did not dare mention the name, mind you, but we sent east and west, north and south, broadcast, to all of our correspondents, evidence so clean and so direct that by and by they "squealed". Inside of two weeks I had a telephone message that asked for me personally. I answered it. It said, "I would like to meet you at the Briggs house at lunch." I met him, and we sat down at a table together, and he said, "You fellows are making it terribly hot for me." I said, "I guess you have made it hot for the other fellow, haven't you?" He said, "Yes, but I can't stand this; I want you to let up. Can I join the National League." Said I, "No, sir; your record is against you." Although that man had been to me previously, and I had told him point-blank that I would not sell him a dollar's worth of goods unless he put up the cash, and even then did not wish to sell him, that I was opposed to him and opposed to his practices, in two weeks after that I had another call, and again he begged me to let up. I said, "No, sir; restitution is the only thing." I had several accounts sent in, where they had slaughtered the goods in order to get rid of them, and during the fall they had done the largest fruit and produce business of any firm in Chicago, and in two weeks more they were out of business, and they have not dared go back. That is the direct work of the National League. Now, gentlemen, you have all the evidence and all the opportunity to find honest men, but how do you treat them? I think Mr. Thayer said, "Find your men (I have no question but he looked them up first; he locked the stable before the horse was stolen), and when you have found them stay by them." Will you stay by anybody today? Will the average fruit shipper stay by anybody? Any man that comes and offers you something for nothing is the one that gets the business. If a man offers more than the market warrants, then he gets the business without any investigation. Now, you should be very careful right here (I wish to guard this point). Our market slumps, and before you accuse a man of stealing, you would better find out what the market was. Mr. Thayer smiles at that. What can you expect when you have sixty car-loads of Michigan berries in one day, besides about five car loads of raspberries, and as many blackberries, dumped on the Chicago market on the wrong day, as we had on Tuesday. We had one of the worst storms, lasting until about eight o'clock, that you ever heard of. It just fairly shook things—we were drenched. What can you do under such circumstances? Of course the market went down. I have seen returns at 35 cents, and I have known of sales at 25, and I question whether the entire receipts from the state of Michigan last Tuesday averaged forty cents for a case of sixteen quarts. Ruinous? Of course it was ruinous. We did not pay expenses on it, not even for the current day. What could we do? The next day, with ten thousand cases less, the market showed firmness, scarcely any appreciable rise in values, but still there was a little rise. I have no question but there will be still a future for strawberries—not very big, because the country is not in condition to command big prices for strawberries, with an enormous crop, the largest I believe that was ever known in the state of Michigan. Be honest with your commission man, the man that you pick out. Sell all the goods you can at home—I have no fault to find with that, and I have no fault to find, as a commission man, with this resolution. We can stand it, but I will tell you this, you will not get any more honest returns after you have it than before. Good moral character! Why, in the state of Illinois, a saloonkeeper can not get a license unless he has a good moral character. It does not make him an honest man.

Mr. Walsh: I happened to be on the committee that framed this resolution, and would simply state to the meeting that the intention was not to give offense to honest men nor to injure honest men, nor to do aught but what was honest and upright. Now, the thought occurs to me, from Mr. Barnett's statement (which, of course, I do not recognize as speaking to the resolution), he simply shows you what he himself did toward promoting honesty and toward getting money back of which people were robbed. If he can accomplish that, how much more can Uncle Sam accomplish? I would like to have that question answered. If there are men in that business who are robbing the people, is it right and just that they should not be turned out of it? Can he offer any argument why they should exist? Can he offer any argument why they should not be turned out? He can talk that commission men are not to blame for anything. A poor man has ten cases of berries, and he expects on the avails of them to buy a pair of shoes for his child or a dress for his wife, or something of that kind; he sends them to a commission man he does not know (he gets a flaming advertisement through the mails, and he sends those ten cases of berries), and he returns him ten cents or nothing. Where is his redress? Certainly there is a law, but can that poor man avail himself of it? Now, what this resolution proposes is to just get around such cases—turn that class of men out who are perpetrating these crimes, and let honest men do the business. We are hand in hand with Mr. Barnett; that is what we want, honest men to do the business. We want to turn the rascals out, and the best way we can conceive of doing it is to license them and have a government officer look after them. When Mr. Barnett puts his money into the bank, the avails of his day's or week's work, there is somebody to look after it and see to it that that money is not thrown away. Why should not the poor man's interests be looked after by this government just as much as Barnett's or anybody's else? The object of the resolution is to correct these wrongs that are going on and to place the business as nearly as possible in the hands of honest men. I can not see for the life of me why any class of men should be considered free-commoners in this country, with the right of just saying to their fellows, "we will send you what we have a mind to for your product." I can not see why any class of men should expect any such right, to the exclusion of all others, for there is no one else who has any such right, and there is not any attempt made to correct any business or any methods but what somebody opposes it. It seems to me there is nothing wrong in the adoption of the resolution by this association; and further, we have the opinion of our congressman and senator, and the opinion of one of the best judges in our state, that such a law would be just and honest, and certainly could hurt no honest man and will dispose of the rogues.

Mr. Barnett: One item of information for Mr. Walsh. There is on the statute books of the state of Illinois a law which will enable any shipper to go to the state's attorney, make his affidavit against any commission man in the city, and if he is wronged, unless that man at once rectifies it, he can be locked up in the county jail, without bail, and sent to the penitentiary.

Mr. Slayton: Does that include fruit sold from Michigan?

Mr. Barnett: From any state, anything that is sold and not paid for, if sold in the state of Illinois, it is a penitentiary offense.

The President: Does that also include false returns?

Mr. Barnett: I presume it does. There was a man arrested in Chicago, where it was claimed he sold 7,000 pounds of poultry out of a carload, and then the same attorney that said that he was engaged in keeping the fellow out of the penitentiary told me just how he did it. They could not put him in the penitentiary under this law, and that law was more stringent than any law the United States congress will ever pass. It is so difficult to prove intent with the wrong-doing, and it is also very difficult to prove what the market on your goods is, and especially on perishable fruits. I simply speak of this as among the difficulties of the question. I am not opposed to these resolutions, but it is under the general discussion I want to air some of the practices and set some of the facts out surrounding the commission business, and enter my protest against vilifying honest commission merchants when you are trying to reach the dishonest ones.

Mr. Graham: It seems to be the popular idea here to-day to advocate these resolutions, and I am well aware that in arising to speak against them I am going against the popular will of this assemblage. But I am opposed to the resolutions on general principles. I am opposed to governmental inspection of private business matters. We have no such thing in the United States to-day. I do not think we ever have had, and I do not think we want it. Reference has been made to our banking system of inspection. That is an entirely different matter. The government in a measure stands behind the banks, stands behind their solvency, stands behind the bill-holder and makes his loss good. Can they pretend to do it in regard to commission men? If you are going to have an inspection of commission men, why single out the commission men who handle only farm products? Why not take them all? Why not go further? Why not appoint a commission to make all men honest, and look after the solvency of every business man? I am connected at home with a business institution outside of my farm operations, that lost ten thousand dollars last year, in bad accounts, a manufacturing institution. We received orders, we sold the goods, we looked up the purchasers in the commercial reports, but before the bills had been paid they failed and our concern lost $10,000. Why not include such—have a commissioner to look after the solvency of such people? Then, again, your banking commissioner does not pretend to look after the individual deposits and accounts and business deals of the individual depositors and patrons of the bank in any sense. If I go to a bank and ask for a loan, and offer to put up certain collateral or certain endorsements, and the bank refuses to accept it, and from my inability to obtain that loan I fail in business, can I go to the United States congress or banking commissioner and ask for redress? Not at all. Think of this a moment before we place ourselves on record as advocating the enactment of a resolution for the appointment of a commissioner. Let us look at it in a practical light. Suppose I should ship, as the poor man did, ten cases of berries to Chicago to a commission man. They go in there with ten hundred thousand more cases, good, bad, and indifferent. I do not get sufficient returns to satisfy me. I enter my complaint to this commissioner. How many complaints would there be entered this week on account of the slump in the Chicago market last week? Is there a grower or a shipper in the state of Michigan who would not have entered a complaint? Is there one single man who would not have entered a complaint to this commissioner? How many commissioners would you need in the city of Chicago, how many hundred commissioners? How many thousand commissioners in the whole country would you need to look after these individual cases and look up the purchaser of an article, how much he paid for it, the condition in which he found it, and so on? Every town in the United States would want a commissioner. Think of it a little before we go into this matter; let us look at it in a practical light. I believe it is the fault of the shipper himself when he is beaten, in nine cases out of ten. There are dishonest commission men, there are dishonest growers, there are dishonest men in every walk of life; but they are in the minority. Last year there were some people in the city of Detroit who were soliciting consignments of fruit by advertising. I got daily cards from those people during almost the entire shipping season, offering the very greatest inducements—great prices, good sales, their ability and facilities for getting rid of fruit were superior to those of any one else. I had had too much experience to be caught. I did not send them any fruit, and I did not reply to them in any way; but I know some poor people who did, some people who needed every dollar they could get for their fruit, who were caught by these things and who did ship them some fruit, and they never got anything for it. That was simply poor business ability—nothing more nor less.

A Member: Suppose there had been a commissioner at that time who had seen what you saw there, could not that have been prevented?

Mr. Graham: No, sir. It is simply private business. I have a right to advertise, and all the laws on earth can not prevent it. If I advertise that I am in a position to handle fruit to the very best advantage, that my facilities for getting good prices for fruit are superior, and people are foolish enough to send me their fruit knowing they have no redress, without looking me up in any way, are you going to stop it by an enactment of law? You can not do it, gentlemen; do not try it, do not do it. In regard to this little matter we were discussing this forenoon, this nursery inspection bill, I had letters by the hundred asking me to incorporate in that some provision that would make some severe penalty upon a person for selling stock that was not truly named. Now, can you do it? We can not do everything by legislation. In fact, there is comparatively little that you can do. We must depend upon our own business ability and business judgment in order to do it. We have in all the states laws similar to this one spoken of by our friend from Chicago, in relation to commission men. Twenty years ago I shipped a dozen carloads of fruit to Minneapolis, consigned it; I left it there to be stored during the winter, in the hands of a commission man. Along toward spring he sent me an account of sales, and he owed me something like eleven hundred dollars, but he said: "My partner has run away and I have not got a dollar—flat on my back, don't believe I can pay you." It was not twenty-four hours until that man was locked behind the bars for embezzlement, and you can do it in any state of the Union, but you can not compel him to send you accounts of sales that are honest. You can appoint just as many commissioners as you see fit, but you can not do it. When there are ten thousand, twenty thousand, or fifty thousand people sending little consignments of fruit or farm products to the great markets, you can not keep track of these individual consignments; they will send you what they please. If the commission men are not doing business right, that is, as a body, let us select those who are doing it right; and above all things, let us drop the commission man just as soon as we can, and sell direct. If they desire our goods let them come to our markets and buy them. They will do it, they come to Grand Rapids and buy our products. We do not ship them to any commission men. They come there and buy them and pay us cash for them right there on the spot, and you can all do the same thing. Take that banking commission, it is imperfect. How much complaint do we hear about the banking commissioner? Take your state banks. Last winter there was a delegation of building and loan association people who asked to have their association put under state inspection, under the banking commissioner, and I asked them how many building and loan associations have failed in the state of Michigan in the past ten years and how much has been lost to the people, and their answer was, "Not any." "Have you had any inspection, any government inspection?" "Not at all, but we need to have and we ought to have." "How many state banks have failed in Michigan in the last ten years?" "About forty." Under a banking commissioner all the time, right along all the time, about forty. Take the city of Lansing, with the worst bank failures Michigan has ever had, right under the eye of the banking commissioner and acting under his authority and advice. These commissioners are not perfect. Not that they are dishonest, but they are only human; they do not know any more about business methods than other people do. Select your bank, know that it is right, and select your commission house and know that that is right.

Mr. Barnett: Now for a suggestion. Organize every locality into an association, have a board of directors as outlined by Mr. Thayer this morning, accept applications for business, and ship only to those approved by the directors. Then stay by them, if they prove true, the entire season, and you minimize your loss and increase your profits.

Mr. Morrill: And watch the business as closely as you possibly can — I might add that.

Mr. Lawton: It occurs to me that this does not meet the evil. The preamble in these resolutions sets forth all the misfortunes under which fruitgrowers are suffering, very faithfully. We can agree with all that is set forth in the preamble, but when you come to the resolutions for the remedy it does not seem to me that it meets it. We can not delegate this thing. There is a disposition on the part of human nature, whenever one gets into trouble, to look around and find a remedy by shoving responsibility upon somebody else. This advocates appointing a commissioner, and what does he do? Why, he simply authorizes somebody to do business, and if that man does not do business right, he will remove him. Now, we know that our troubles in Chicago are not with "snide" commission men. I never deal with such commission men or men of no responsibility whatever. There are men who make no returns, and all that, and those men will get certificates to do business and you can not reach them or find out who they are. The remedy must be different from that. I do not think the appointing of a commissioner to give somebody a certificate to do business, and then taking it away if he does not do business right, is going to remedy the evil. We must get away from the commission man. Have as little to do with him as possible, and contrive in some sort of way to sell our fruit and not allow them to eat us up.

Mr. Cornelius: I just want to say this, as to why we did not make this resolution large enough to cover all creation. We must commence as we can. This inspector in Chicago is not a man who is to go there and do everything. He is a man, as I understand it, to be appointed by the government, but in case letters are written to him, or business actions of parties in the commission business are complained of, he is to be empowered by congress to go and command them to show up their books and their sales.

The President: I did not understand the resolution in just that way, but that the government was to license them first.

Mr. Cornelius: License them, and by the means of their holding a license the government has power to control them in this manner. I can not see anything about that which is wrong. I am glad to hear that Mr. Barnett and his society are co-operating with us and working in the same line of business, but there is this point about it, they do not seem to touch the class that are ruining us, that are stealing our goods. I use these terms because I know it. I have sent goods over there and have traced them and have found that they sold for one third more than returns were made for.

The President: You could have locked that man up in the penitentiary.

Mr. Cornelius: I did not know it. I have just found it out to-day. But that is just for Illinois. We have commission men in other states. Have all the states that law? We want this to be a United States law that will protect us against the commission men — the dishonest ones. We wish to work with the honest ones, with Mr. Barnett's society.

He says they have no fight with us. In proof of that will his society turn around and help us to get this law enacted, because then the fruit will go into the hands of honest men?

Mr. Cook: This resolution is up before the state society, where there are but few who have thought about the question at all, and I think it ought to have more consideration than this; and, if it is in order, I move that it be postponed or laid on the table until another meeting, or be left to the executive committee for their consideration, if that could be done.

The President: There is a legislative committee in the society.

Mr. Cook: Well, let it go to that committee, or a proper committee, to be examined thoroughly and discussed at a future meeting. It seems to me we are not ready to vote on this question now.

The President: I have had considerable experience shipping fruit, as many of you know. For ten or fifteen years I have shipped almost as much as any man in Michigan, of his own growing, and during that time I have not had any trouble with the commission men. All this sounds as though it was a fight against somebody, some commission man. I know that there is rank work among the commission men, and I know that they are not alone in doing these things; but I do feel as though this resolution does not cover the entire ground; that, if you propose to ask for legislation of this kind, you should include the fruit-grower, see that he does not defraud anybody. Then you can ask for common honesty among all men, and enforce it, if such legislation is practicable. When you do that you will do away with a great deal of trouble, but I feel as though we ought to be a little careful about these matters. The state society does not wish to put itself in a position to be criticised, but it is anxious to do anything and everything that can really improve the fruit interests of the state of Michigan. I hope you will look at this carefully.

It was moved by Mr. Graham that the matter be left to the legislative committee for recommendations to be presented at the next meeting. The motion was seconded by Mr. Barnett, and was put and carried.

PROCEEDINGS OF THE ANNUAL MEETING.

HELD IN ITHACA, DEC. 1, 2, 3, 1897.

The first three days of December were devoted by the Michigan State Horticultural society to the work of its annual meeting, Ithaca being the place of its assembling. They went to a region new in horticultural enterprise, but one possessing many possibilities for all fruits except the peach. The beginnings already made afford ground for strong hope of great extension and success.

The earlier sessions were not satisfactory in point of local attendance, but later this disappointing feature was removed and large audiences lent the encouragement to the many who went from about the state and presented a highly meritorious programme, which was carried out in all its features.

The election of officers resulted in re-election of Roland Morrill of Benton Harbor for president, much against his wishes. Edwy C. Reid of Allegan was re-elected secretary; Asa W. Slayton of Grand Rapids, treasurer; C. F. Hale of Shelby and R. D. Graham of Grand Rapids, members of executive board for three years. R. M. Kellogg of Three Rivers, who had been appointed by the executive board to fill a vacancy on the board, was regularly chosen to the place. The board chose C. J. Monroe of South Haven vice-president, and R. L. Hewitt of Lansing librarian.

Reports made by the secretary and treasurer showed the society's affairs, both as to membership and finances, to be in excellent condition, the annual memberships being greater than in any one of ten preceding years

Two evening sessions were made more instructive and entertaining by illustration of the lectures by means of a stereopticon, one enjoyment not on the programme being a presentation of many views of the Agricultural College, made by Prof. Taft, with accompanying explanatory remarks. The instrument was also used in illustration of Prof. M. B. Waite's lecture on "Diseases of the Pear and Apple."

Special interest was manifested in the matter of inspection of orchards and nurseries, and the papers on this subject by Messrs. Hedrick and Fifield. The latter presented the bill which the American Nurserymen's association is endeavoring to secure from congress, and a resolution endorsing it was passed, and the secretary instructed to forward a copy to each Michigan member of congress.

Prof. W. W. Tracy gave notice of a motion to amend the constitution in regard to the election of officers, to be presented at the next annual meeting.

Ex-Prest. Lyon sent a copy of his important work, a catalogue of American fruits, prepared for the American Pomological society and issued as a bulletin of the national department of agriculture. This was referred to a committee which made the subjoined and unanimously adopted report:

The committee to whom was referred the Catalogue of Fruits prepared by our honorary president, Hon. T. T. Lyon, and published by the national department of agriculture, note some improvement in this report over any preceding one, particularly in that the fruits are classified in fifteen divisions, so as to include areas of similar climatic and soil conditions, instead of by states as has been the case in previous reports. A second improvement is the result of a careful and wise revision of the nomenclature, the dropping out of superfluous words, etc. We are impressed first with the great amount of painstaking care that has been given to the work, and with the accuracy and extent of the information it contains, and the condensed and available form in which it is presented. Every fruitgrower should secure a copy of the Catalogue. We owe a debt of gratitude to Prest. Lyon for this labor of love for our benefit.

WILL W. TRACY.
L. R. TAFT,
M. B. WAITE.

RESOLUTIONS.

We recommend a vote of thanks to the Gratiot County Horticultural society and the committee for the hospitable manner in which we were entertained, and for the commodious hall furnished for our meetings, and especially to the young men, Frank Cowdery, Ashley and Bradley Stone, who furnished such admirable music. We thank the village officers for the courtesies of the village, and the press for attention and full reports.

We congratulate the society upon the satisfactory working of the new nursery inspection law, as evidenced by the report of the inspector, Prof. Hedrick, and recommend its strict enforcement.

R. D. GRAHAM,
C. F. HALE.

ANNUAL MESSAGE.

BY PRESIDENT ROLAND MORRILL OF BENTON HARBOR.

There is very little that I think of that I feel it is necessary for me to say here and now. My opinions are hardly worth while putting before you, and as we have good papers that will bring out all of the opinions that I may have, before we get through, and which will have a fair discussion, I do not know that I care to say much more than in a general way to talk of what might perhaps be termed the horticultural situation, and talk of it from a commercial standpoint.

It has been urged repeatedly by some of our oldest and most respected members, and by others not members of the society, that we were paying altogether too much attention to the commercial side of horticulture; but when I discuss it, for some reason there does not seem to be any other way for me to do. About the only knowledge I have of horticulture is the growing of fruit and vegetables for money. So, if I say but little about the ornamental side of it, those of you who bring a message of that character can fill it in. I do not like to talk to you about anything with which I am not myself familiar.

There is a condition of affairs that seems to extend all over the United States at present, in regard to the horticultural situation, that it seems we should begin to study carefully. There is over-production or under-consumption. For fear that we might discuss politics, perhaps we would better not use those terms, or go too far into that; but this condition of affairs is somewhat variegated. There has not yet been a year but in some particular location some crop sold for less than its cost of production, since I have been in the business. At the same time, there has been some other point where the same crop, if it could be placed there, would have sold at a profit. There are many elements that have intervened. There are the dishonest practices of certain men, and they interfere with the fair distribution of fruits and with getting what they are worth, or at least getting the money back to the man to whom it belonged. Those things will be discussed later on. But we will go back about five years, and say that fruitgrowing in general was then a very profitable occupation all over Michigan. We will deal particularly with Michigan in this. Ordinary farming (the growing of grain and raising of stock) was becoming depressed. It was not showing the margins it had shown in the past, and it was generally understood that, through the action of the State Horticultural society and other societies, fruitgrowing was a profitable occupation. We went out and told everybody how we did it. Various societies and various men have traveled over the country, explaining how they have succeeded, telling of their failures, pointing out the things to avoid and the things to be observed, and the farmers left their farming and went into fruitgrowing, planting fruit trees where before they had planted wheat.

In 1896, so far as small fruit was concerned the people of Michigan found themselves confronted with crops which they could not market at a profit. We find that in farming sections having small cities and villages, which in the past the regular fruitgrowing regions were able to supply, the farmers have gone into the business and have a surplus. We find that occasionally one has a good fruit farm. In the great city of Chicago they have found their outside order markets had been provided with a surplus, more than the public demanded. Consequently the prices in many cases have been below the cost of production.

Now, we have a different condition of affairs which has arisen during the last year. Wheat is doing better, meats are doing better, butter is doing better, eggs are doing better, and the general farmer is making more money than he has the last two or three years, and there is light ahead. In sections with which I am acquainted, many of those people who rushed into small fruits particularly, just in time to meet the tidal wave that overcame their fields of small fruits, did not pick the fruits but let them go to waste. This fall you see some very fine wheat fields where there were nice berry fields last spring. It simply illustrates the unsteadiness of the average farmer. We are not quite cautious and calculating enough, we are not quite well enough informed in regard to things that are beyond our particular horizon, we are likely to draw conclusions from what we see in our own neighborhood. We do not read the periodicals carefully enough, we do not attend meetings and listen to reports from other sections closely enough, and these things have led us into error many times. I am expressing my own opinion, which I believe the history of the past twenty-five years has proven. I believe that the history of the next ten years will write a whole lot more of the same thing. It appears to me that there must be a new order of things; that people, if they expect to succeed in horticulture, must study the situation more carefully, must not go on buying thousands and thousands of peach trees to set where a peach tree can not possibly thrive—and the same as to any other fruit, but peach trees particularly. People are setting them all over this state, in all sorts of locations—they are setting them anywhere from swamp to hilltop, setting them where they have no right to expect peaches o pay very well, only perhaps to in the end disgust them with the business. If you are hoping for the future you must care for it. I think we are going to see in the next ten years a lot of history written on the peach question, and it will be a history of despair to a great many men. It will be the turning point. It will cost them loss of land, or come very near it. Now, for a man who has been in the nursery business, that is a cruel thing to say, but I believe it is right. We must do the work with a little more steadiness, we must figure more carefully, we must understand what we are going into before we go into it.

I do not think I wish to talk very much on these subjects, because I can not do it without running into the topics of the programme, and then you will get the details of all of it. But there is one thing more that I might say. The men who go from ordinary farming into fruitgrowing must adopt better methods than they have been accustomed to; they must take into their work a better understanding of details, more minutiæ, greater care and deeper study than they have ever attempted in ordinary horticulture. You will have nearly everything to contend with. By the time you are fairly into it you will find mysteries of cultivation opening up to you that you never thought of, perhaps; you will find the conflict with insects and fungous troubles everlasting; you will find that mistakes are expensive. You can ruin an orchard in a day, or you can make a thousand dollars in a day, depending entirely upon what you have in your head when you begin. All those things have been done in this state, and the object of these meetings is, to show men the very best way, so far as is known. The members of the society have either the experience, or have gathered the evidence and experience of others in such shape that in the annual volumes is recorded the year's experience of the best and most scientific people in the country. I think every fruitgrower should secure the Reports as they come out, and listen to the topics as they are discussed; secure the best periodicals, and study them carefully.

SECRETARY'S ANNUAL REPORT.

The past year has been one of fair degree of prosperity to the society. A year ago our annual meeting at Grand Rapids was an exceedingly large one, a long one, and well filled from beginning to end. We would really like to meet in some large place on every occasion, or in some of the fruitgrowing centers of the state; but the fact is that, as a state society, our labors are expected to extend throughout this commonwealth, and to encourage fruitgrowing in every corner of it where a start may be made or where we can make an opportunity for it. We therefore come, at the urgent request of the officers of the local society, to Ithaca at this time, and hope that we may be able to stimulate the fruit industry, which is already very well established in its beginnings in this county.

During the year I have received reports from the following fifteen local societies: Ann Arbor, Bloomingdale and Gobleville, Saugatuck and Ganges, Hudson, Muskegon, South Haven and Casco, Lenawee County, Saranac, Oceana County, St. Clair County, Covert, Otsego, Lowell, Ottawa County, and Laketown. These were in answer to circular letters asking them to send me a complete list of their officers and members, with their postoffice addresses, not only for reference for the work of the State society, but that we would undertake to supply to them certain publications of our own and of the experiment station of this state and the stations of other states. I wanted to obtain a great many more bulletins than I was really able to secure. We did succeed in getting the national Department of Agriculture to agree to send their horticultural bulletins and publications; also, those of the Michigan experiment station and the same of the Ohio experiment station. Corresponding with the stations at Geneva, New York, and at Cornell university, I tried faithfully to get them to do something, and in Massachusetts, but they all maintained that their appropriations or their laws, or something of the kind, stood in the way; and, while they would like to do it (and really I think tried to do it), they found they could not, and they did not understand how Ohio could. But to receive those of the experiment station of this state and the publications of the Department of Agriculture was certainly a great advantage to our members.

The local societies of the state are in good working order in the main. I spoke one year ago of the unfortunate condition of the Ann Arbor society, which has lapsed through dissension of its members, due to efforts in the way of co-operative shipping to Detroit, and it remains dismantled entirely and doing nothing. Otherwise, every society holds meetings through the winter at least, and more or less in the summer time. Some of them, notably the old ones at Adrian and Grand Rapids, have kept up regular meetings at least once every month the year around, with an effectiveness that must do a great deal for horticulture in those vicinities. There have been two or three new societies established during the year, and one in my own county, at Laketown.

With the general horticultural conditions of the state the past year, I think you are well acquainted. We had large crops of small fruits, and, although they sold at low prices, they were profitable in localities where there were not great quantities for shipment. I believe as a rule most of the small fruit raised in the fruit belt in the western part of the state proved rather unprofitable, although the quantity was exceedingly great. The output was enormous and the returns were not satisfactory on the whole, yet in certain localities the results were quite the contrary, and so far as I have learned were entirely satisfactory. The same rule obtained throughout the state in relation to the small fruits.

The apple crop of Michigan was nothing and scarcely deserves mention. There was one peculiarity in the western part of the state, that the Northern Spies, which bore heavily one year ago, were this season scarcely worthy the name of apple, except in a few instances where men sprayed faithfully and kept it up. I do not know how general this was, but I know several instances of it, and undoubtedly they were wise men and thorough.

The peach crop was limited to the extreme western part of the state almost entirely, where it figured as about one third of an average crop; and of course, under such circumstances, sold at satisfactory prices, the fruit being very large and fine, because it sparsely covered the trees.

The matter of the observance of certain horticultural laws also will come up in connection with a topic on the programme, and Mr. Graham is here, familiar with the enactment of those laws and the nature of them, and especially with regard to the spraying of orchards for insects, or the better regulation of baskets, in marketing, etc.

ANNUAL REPORT OF TREASURER.

RECEIPTS.

Balance on hand December 1, 1896, cash in bank	$309 51
Received annual membership fees Nos. 1 to 71, inclusive	71 00
Received interest on loans secured by mortgages on real estate	144 60
Received interest on deposits in savings banks	10 84
Received partial payment of principal of one loan	15 75
Total of income for the year	$551 70

EXPENDITURES.

For two boxes for books and cartage, sent to Lowell	$0 25
For two boxes for books and cartage, sent to Lansing	25
For postage and street car fare during the year	70
For loan to John D. Case and wife, real estate mortgage	300 00
Total of expenditures	$301 20
Balance on hand in savings bank	250 50
	$551 70

ASA W. SLAYTON,
Treasurer.

SOME OBSERVATIONS ON FRUITGROWING IN 1897.

BY MR. J. N. STEARNS OF KALAMAZOO.

In the Report of this society for the year 1877 (twenty years ago), page 235, is a paper I read at the annual meeting held at Grand Rapids, entitled, "Preparing fruit for market." This Report fell into the hands of a gentleman in New York, who had been in the commission business there twenty-five years. He said he was so well pleased with the points made in that paper, that he must write me, and he did write me a very nice letter; and among the other things, he said the position taken regarding conscientious grading and packing of fruits was wherein all the profits lay. I hear it frequently remarked by my neighbors, that they believe I make more off from my fruit farm than any one else on the lake shore. If this is true, it is not because I grow better fruits, but for the reason that I adhere strictly to the careful grading of my fruits, so they give better satisfaction for the price charged. Now, if I were convinced of this twenty years ago, I was more than convinced of it last year and this. Out of 20,000 baskets of peaches last year, I made but one shipment of first-class peaches to the over stocked market of Chicago, and that was one hot Friday with fruit ripening so fast I could not hold it until the first of the week for my customers. The crop was sent out on orders to regular customers (some of them of twenty years' standing), and the most gratifying part of the whole business was, not a complaint came from any one, either as to price or quality.

Now, my friends of the State Horticultural society, there is an immense amount of fruit being planted in this state, and from my observations for the season of '97 there is no such important matter to be considered by the fruitgrower, both for the individual and for the state. This state is getting an exceedingly bad reputation for "snide" packing. A friend of mine bought about eighty carloads of peaches at South Haven this season, and his partner sold most of them in other states. I heard his partner tell him he could have gotten an average of $50 more per car if he could have guaranteed the packing. Now, there was a loss of $4,000 to the growers in just that small territory, as they would have been willing to have paid that much more for the goods if they could have guaranteed. That is but a small part of the profits that would be derived by establishing a reputation for the future. As I have stated before, I believe it would be a good thing for this state if we had to ship all our fruits (for a few years at least) to the distance of California. Then we would soon learn it would pay to ship only good fruit.

Another observation of '97 is, we are leaving too much top on all our trees, not heading back and thinning out enough, so as to concentrate the vitality of the tree and improve the quality of the fruit, also preserve vitality for future crops.

I made a great mistake the past season in not thinning my pears more thoroughly, especially the Bartlett. I had a great crop of pears this season, between two and three thousand bushels from five acres. But there were too many small ones. I could have realized more money if nearly one half had been picked off while very small, and the trees would be in much better condition for next season.

Each year I become more and more convinced of the benefit of very frequent stirring of the surface of the soil in dry seasons, with a weeder or fine-tooth smoothing-harrow. In fact, it can not be done too often. With proper attention to this and with sufficient amount of fertilizers we may grow good fruits, no matter how dry the season.

Another observation of '97 is that with the very large planting of fruits of all kinds it behooves the planter to put out sorts that will sell for a fair price in seasons of abundant crops. As a rule, such sorts are not as sure bearers, but in seasons of big yields these bring the price to make the profit.

Four years ago strawberries brought a big price, selling in Chicago at $3 per case of sixteen quarts for the best. This caused many to plant large plats, and the results the past season were that many shipments were made that did not pay the cost of picking, to say nothing of the expense of package. It reminds me of the experience of many some twenty years ago. Hops went up to $1 per pound. Everybody planted hops; and of course, as soon as they began to produce, the price dropped so low they did not pay for picking, and nearly everybody hopped out as quickly as they hopped in, but to the few who continued to grow them as a business, handling them properly, looking after the market, etc., they proved a paying crop.

So it is with small fruits. The past season there was no great profit, but the grower who looked more after quality than quantity, put his fruit up in a tasteful and attractive manner, looking after his special market, was able to make a fair profit; while the grower who shipped his fruit to commission houses in Chicago, I think in nearly in every case, met a loss instead of a profit. I have witnessed several ups and downs during the last thirty years, in the prices of the small fruits especially, but the grower who has adhered to the points made above has found small fruit production a very satisfactory business for the capital invested, and I have full faith in it for the future.

DISCUSSION.

Mr. M. L. Croy: I think this paper contains a fact that is worthy of our consideration and practice, namely, that of making selection of choice fruits and growing them. Six or seven years ago I thought about all that was necessary in order to have a crop of strawberries was to get your plants some place, bring them home, dig a hole in the ground, put them down and cover them up with a little dirt, give them a little attention when you had time, and when you did not, let them go, and they would pay you for what trouble and expense they were to you. I did not make a success of growing strawberries in that way. I read of Mr. Kellogg through the papers. He was recommended to me by a friend, and I dropped Mr. Kellogg a letter and he sent me his catalogue of small fruits and how to grow them. I followed Mr. Kellogg's instructions so far as I could. I found that it paid better, and I want to say that I am striving to do just as Mr. Kellogg said I should do in growing fruit trees, etc. I also got some plants of Mr. Mason, a member of this association. He gave me some instructions in regard to setting and cultivating them, and my strawberries this past year were a success, I had a fine crop. I kept them restricted, I did not allow them to mat; I set them about 3½ feet one way and about 14 inches the other. I had some Bubachs this year with 10 in a quart measure or 14 to 16 berries. I sold Crescent berries for 6½ cents per quart when other strawberries were only bringing 4 and 5. I had also some small berries for which I only received five cents per quart. I have found this year that it is the nice, large berry that commands the market, and the berry that will sell under all circumstances anywhere is the large, perfect strawberry. Also, I have found in my experience in growing the black-caps, that it is not good policy to set vines too closely together. I set mine 8½x4½. This year I had a big crop of black-cap raspberries. I thin my shoots down to about four or five in a hill, not more than five, and I prune back very short, to about 6 or 10 inches, owing a good deal to the position the limb occupies with relation to the stalk, and if it seems to be firm and go up middling straight I cut it a little longer. I had from 600 plants this year 110 bushels of black-cap raspberries. I sold them for four cents per quart; I paid between $75 and $100 of debts and had enough left to buy a few things for the family.

Mr. Morrill: Mr. Croy, one part of your talk brings out an idea that perhaps is worth suggesting to you or to others. I have about twenty-five years' experience with black-caps and blackberries, and while you mention the length at which you cut the lateral off, you will find that with different varieties the proper length varies very much. It is one of these questions of detail that I spoke of. More particularly in the blackberry than in the black-cap, you will find a wide variation. Perhaps, when you do have a good deal of experience with different varieties, you will regulate that by the number of buds. You will find they vary on different plants, you will find in some varieties that every bud from the barren cane out the whole length of the lateral bears fruit. You will perhaps find the next variety with only three or four buds. This is one of the little details that I spoke of that every man has to study before he gets complete success, but perhaps taking some other variety—I will not name which variety, but I presume you had Gregg.

Mr. Croy: Ohio.

Mr. Morrill: Well, Ohio is one of the hardiest producers, but the oldest berry-growers on our shore do not plant it any more; but if you had Greggs you would probably have to cut them a little longer in order to get the same amount of buds. Ohio is a close budding variety. There are these differences that have to be studied, and which a man has to understand to be able to get the very best results. It holds good in all other fruits.

Mr. Stone: I am interested, and I wish to know what those have to say who know about these things. I am experimenting, and experimenting, you know, is somewhat expensive. I read some, think a little, but do not give as much attention to fruitgrowing as I might if I were engaged in that business principally. I have a little plantation down here, with some berries and some other fruit that I am trying to raise. I have had some success with small fruits, and a good many failures. I was interested in what was being said about the cutting back and pruning of the raspberry. I have tried various ways. I have fruited Gregg and several other varieties. I found Greggs a little tender in this climate. With the strawberry I have done very little. I tried it one year with very poor success, I think owing to the fact that the season was very dry and perhaps my plants did not have proper care. They were upon loose ground and upon a south and east slope. They did not seem to get much moisture, and, while they produced a very fine plant growth, they had a very poor berry growth. This year they bore a fair crop, although the year before, 1896, was the year when they should have borne their main crop, but there were then very few berries; for that reason, not having borne fruit, I thought I would see what they would do the next year and they bore a very nice crop.

Mr. Marvin: As for strawberries, I set an acre here. I have had fairly good success with them so far as prices are concerned. There are no berries shipped in here now. A few years ago all the berries were shipped in. Now the berries are grown here in sufficient quantity. There are none shipped out from here, to amount to anything, either.

Mr. Morrill: You depend upon the local market?

Mr. Marvin: Yes.

Mr. Morrill: Do you find any trade among the farmers, among your neighbors?

Mr. Marvin: Well, some, of course. The farmers come along there and know I grow strawberries, and they will occasionally stop and buy a few. Occasionally some will drive out from the village, but they are mostly brought here to the village and one of our grocerymen handles them for me.

Mr. Morrill: Do farmers as a rule grow enough berries for their own use?

Mr. Marvin: No, sir, they go without.

Mr. Morrill: They are missing a good thing, aren't they?

Mr. Marvin: I think so.

Mr. Morrill: Mr. Brook, can not you give us a general idea of the horticultural matters in this county, to what extent fruit is cultivated, whether it is improving or otherwise, and what your ideas of it are, what the chances are?

Mr. Frank W. Brook: I think the cultivation of fruits generally is increasing. However, this country is devoted almost wholly to general agriculture, but I can remember a few years back, along in the 80's, when you could scarcely buy a berry or vegetable in the open market. Today you can buy everything in its season, and most of it is grown at home, and in the last five years especially the local product has much increased. Until the present year the market was rather below par. In fact, I have known berries that were sold for less than the cost of production. I have in mind one man who told me his experience: That a merchant sent to him for berries, and he sent back word that if he would come and pick the berries he might have them, but he did not feel like donating the time for picking.

Mr. Morrill: How are tree fruits in this county?

Mr. Brook: Well, apples are more largely grown than any other tree fruit. The other fruits also are grown, especially plums and berries. The apples are not receiving proper care, but we have, though, a very good supply of fruit. We generally have an over-production of apples one year and the next year we do not have any. Last year they were abundant. You could have any quantity of them for picking them up. The great fault with our apple orchards is that there are too many summer and fall varieties and not enough winter apples. The price of winter apples in this section is always high; on the contrary, the price of fall and summer apples is always low when we have any. But apple trees are being planted, and I think that tree fruit generally is being pretty well planted in this county. A good many trees are coming each spring, but not the quality that should be.

Q: How about peach trees?

Mr. Brook: I think the peach tree is not adapted to this country.

Q: Are there any orchards?

Mr. Brook: There are some small orchards. There may be localities in the county that will produce peaches; in fact I have had a few trees myself that have produced, the last three years, fair crops, but this year they were failures. However, I do not think the country is adapted to growing peaches, nor that they will ever be a success here. As I say, there are some favored localities that may perhaps produce crops of peaches here, but as a general thing, as a paying commercial crop, I think they are a failure.

Mr. Pitt: I think this in regard to peaches, that while Mr. Brook is on the whole correct as to the larger portion of the county, still I think we have some land adapted to peaches—in fact, I know so. I live about seventeen miles from this place, in the northwest corner of this county, on what was formerly pine land. It is high, elevated land, perhaps 75 to 100 feet above the level of the surrounding hardwood country. I have some seedling peach trees there that I planted some fourteen years ago, and those trees came into bearing, about four years after setting. We have had more or less peaches every year. This year we had from the old trees a very fine crop of peaches. Many of the old trees have died down and sprouts have come up. They have grown right in the sod, no care nor culture whatever. I have a young orchard, however, of 600 trees, that I set four years ago this coming spring. The soil is sandy gravel with a clay subsoil.

Mr. Morrill: Red clay?

Mr. Brook: It is a kind of reddish clay. There seems to be iron in the clay, or something that gives it that color, and a great deal of small limestone from the size of a nickel up to as large as perhaps two or three inches in diameter, and that seems to underlie this gravel and loam on the top. These 600 trees I set four years ago this coming spring. We had a few peaches from them this season, and they were very nice. I have now altogether a thousand trees, and I have a good deal of faith that I am going to raise peaches up there.

Q: What about grapevines?

Mr. Pitt: Well, I have a little block of 64 grapevines. They are set 8 feet apart each way. I set stakes about six feet high and trained the canes to them. After a couple of years I set two other stakes to each vine, and then I put a cap on top and had them down so that they would hang over the tops of those stakes, trimmed them back, and we have had for a number of years good crops of Concords and some Agawams. They have done very nicely, stood right up there and endured the winters, and so have my peach trees.

Q: How far is the lower land from where your peach trees are set?

Mr. Pitt: It is from a hundred rods to half a mile.

Q: A large extent, then, of low land?

Mr. Pitt: Yes, sir; to the north, south, and east of me is all low land. On the west, for a number of miles, it is high pine land.

Q: Are there other bearing peach orchards west of you on the high land?

Mr. Pitt: There are not. There are a few orchards that have been set.

Q: The same success that you have?

Mr. Pitt: They have not been set long enough to know what they will do.

President Morrill: The character of soil you describe is really No. 1 for peaches.

Mr. Morrill: Mr. Mason, what have you to say in regard to this paper, or anything of interest regarding Gratiot county horticulture?

Mr. Mason: Well, I do not really live in Gratiot county, but as you are asking for an opinion in regard to tree-setting, I will say I have canvassed this county quite extensively, and have sold a good many trees in the last six or seven years to be set in this county, but most of the trees I am selling in this county are plum—not many peach.

Mr. Morrill: Do pear trees seem to do well here?

Mr. Mason: Yes, first-rate, and I would say that I have seen some very nice peach orchards, and I can also cite you to one out here which I think has been set perhaps six or seven years, started and then added to right along, and had fair success. It is on a high piece of land, about fourteen miles southwest from here; and in regard to my own county, Ionia, there the peach business is quite extensive. Large orchards have been set in the last four years. In Montcalm county, this year, where there were peach trees big enough to bear they were full of peaches, straight west of here. It was right in by Sheridan. An old friend of mine near Sheridan had 300 peach trees that were perhaps seven or eight years old, and he sold from those trees 625 bushels of peaches this year, and I thought it was pretty well, when we had none in Ionia county to speak of. I have several kinds of strawberry, and speaking about the market as to farmers, I had this year somewhere about 3,000 quarts of strawberries, and I sold nine tenths of my berries at the door to the farmers; they came right after them; and in canvassing through the country I try to sell plants to the farmers, but they say, "No, Mr. Mason, we do not wish to bother with your plants, but we will buy your berries ourselves, we can buy them of you cheaper than we can raise them," and that has been my experience with the farmers in regard to small fruit. I can sell them trees better than I can sell them berry plants.

Mr. Brook: I think in this immediate vicinity, the soil is a quite heavy clay, there are quite a good many berries being set, and apple trees around here are doing pretty well. This year they seem to have suffered some from blight. Many pears have fallen off for want of spraying, but I think the soil is adapted to berries.

Mr. Morrill: This peculiar style of soil of which Mr. Pitt spoke seems to be remarkably well adapted to growing Bartletts. Where there is red clay with limestone mixture in the subsoil were the finest Bartletts I have seen in the state. What do you say about that, Prof. Taft?

Prof. Taft: Very good, yes, sir.

Mr. Morrill: I see better pears on that than I do on the heavy sub-clay, as a rule, so far as Bartletts are concerned. Some other varieties are different.

Mr. Pitt: When I started on my farm over here I had no experience whatever in fruit culture. I used to come over here, and at the county clerk's office I found a lot of Horticultural Reports, and I took those home and read them, and what information I have in regard to the fruit business I got from those Reports and from my actual experience.

Mr. Croy: My soil, on which I spoke of growing those Ohio black-caps, is the very same kind of soil that my friend Pitt says he has for his peach trees. I dig down about 14 or 16 inches and find a reddish sand, and it is very firm; I can hardly dig it with a spade, while on top of that is a kind of gravelly sand-loam which is very loose. I could go this summer into my garden where I had my berries, and run my hand down into the ground six or seven inches, take the soil up, and find it damp. Even during the drouth it was damp, and I find that soil of that kind will hold moisture—what it gets it will hold, it will not leach out and go down or go up; but you have to cultivate thoroughly, keep your cultivator going continually, when you have vines there, and keep the moisture and not let the ground bake. It will bake in a very few days after a rain; and if you let a crust form over the top, the water will evaporate. Now, as a rule, as Mr. Brook says, this county is not adapted to peaches. Why? Because the most of Gratiot county is low land; about one half of it is what you call low or swampy land, especially around Ithaca. But wherever there is high land in this county, I have discovered that peaches can be grown just as successfully as they can in Ionia county. I have traveled over this county considerably during the past few years, and last fall I found numbers of places where there were peach trees, and wherever I found peach trees I found plenty of peaches. There is one man about two miles south who had some trees set right along in his fence corners, and I discovered that those trees were low, even bending almost to the ground with peaches; and a neighbor had a fine crop of peaches this year, but his land is highly elevated; it is clay and gravel and sand mixed, with a good deal such bottom as Mr. Pitt spoke of. As far as pear culture is concerned, I believe there is not a farmer in Gratiot county but, if his land is high enough to prevent the water from standing on it, can grow the Bartlett pear successfully.

Q: You have seen some of them?

Mr. Croy: Well, I had a Bartlett pear growing in my garden, that I set out there five years ago last spring; I have had four crops of pears from it.

Q: What was the quality of the pears?

Mr. Croy: Well, they were nice, average-size pears. That tree has borne a crop of pears every year for me. I have kept it restricted.

MICHIGAN FRUITS IN COMPARISON WITH OTHERS.

Mr. Reid: Mr. Tracy, you travel around this country more or less. What do you find in your observations as to the reputation of Michigan fruits, as to their reliability in packing or their quality, etc.? You run across them occasionally in the markets, and what is said?

Prof. Tracy: Well, I have not been where I could get very extensive information in regard to that, only a general impression as I have traveled around in different places. I frequently hear Michigan fruits referred to as the very standard of quality. Again and again, in California and in Washington and Idaho, the past summer, and I remember specially in Sacramento, in Sacramento valley where they raise a large quantity of cherries and apricots, also in Sonoma county—in both these places I heard gentlemen speaking of their fruit in California, saying, "Of course we don't raise any such fruit as you do in Michigan." I was interested at that time in this statement as coming from a Californian grower, and I modestly agreed with him just as unostentatiously as possible, but I thought that the man had some sense. I will say, however, that there is a region that we do not get any fruit from, and that is the northern part of Oregon. After descending the mountains, the Coast Range, you come into hilly land, and there they raise the finest fruit I have ever seen, it seems to me. It is fully equal to anything I have ever seen in Michigan, so far as quality is concerned, and fully as beautiful as any of the southern California fruits in color and size.

Mr. Reid: What kinds of fruit?

Prof. Tracy: Peaches specially, I noticed, the finest peaches I have ever eaten, finer than I have had in Georgia or Michigan. It is in the northern part of Oregon, just after you pass out of Washington.

Mr. Morrill: That just brings up one idea that a good many people, if they stop to think of it, will know as a fact, but of which they seldom think. The northern limit of successful production of any fruit produces the highest quality. It holds good in grains and vegetables, does it not?

Prof. Tracy: Yes, I think so.

Prof. Slayton: There is a quick production of the entire fruit, and with quick production it does not become tough. If you could raise a peach over night you would have a better peach than you can raise in ninety days.

Mr. Morrill: By that rule, Alexander would be better than Crawford.

Prof. Slayton: Alexander came from too far south.

Mr. Morrill: The best quality of apples in the world, perhaps, come from this section that Prof. Tracy speaks about, or through northern Michigan, Canada, and northern New England, so far as quality is concerned, of the varieties there grown, but there are other varieties that succeed away south and are far better than the same varieties would be in a northern latitude.

Prof. Tracy: The Alexander peach has its natural length of time, and the further north you could produce it and have it grow and ripen, the better it would be. There is just the same difference between apples and peaches in natural length of life, I think, as there is between cats and dogs and chickens; that is, one requires a certain length of time for its life, and another a certain time for its life. The Alexander peach requires so long and the Crawford so long, and the shorter that length of time for each particular variety the better the fruit.

MANY PHASES OF PEACH CULTURE.

Mr. Mason: Give me the characteristics of the Triumph peach.

Mr. Morrill: Prof. Taft, have you seen it yet in fruit?

Prof. Taft: No, sir. I have some trees that will bear next year.

Mr. Morrill: At a meeting of the Western New York society, two years ago, they discouraged me on that. A man that knew most about it said I would better not go into it, that they were too small. Now, I perhaps was a good deal slower on that variety than I usually am on a new variety of peach, because of what a few men said of them that I knew were very well informed. At the same time I believe you, Prof. Taft, have seen them of a very high class, have you?

Prof. Taft: It is a yellowish Alexander. Those that I saw were very ripe. They were free, but I understand that when picked they are not quite so free. Of course, those I had were shipped from Georgia and they were on their way ten days.

Mr. Morrill: People at Rochester based their calculations on it as grown in New York. Now, it may be better south than it is north.

Mr. Croy: I would like to ask Prof. Taft what he knows in regard to New Prolific peach, of its hardiness and its quality, and whether it is a profitable peach to grow.

Prof. Taft: I would say regarding New Prolific that, as I have seen it in bearing, and I have seen large amounts of the fruit, it is a fairly handsome peach, a yellowish peach with slight tinge of red; of good size, good quality, and it seems to be about as hardy as our so-called hardier varieties.

Q: As hardy as Hill's Chilli?

Prof. Taft: I should say not quite so hardy as Hill's Chilli.

Mr. Morrill: About as hardy as Kalamazoo.

Prof. Taft: I was going to say that, so far as size, shape, color, and propagation go, it compares with our Kalamazoo—in the same season; so far as I can see, it is very much like Kalamazoo. You are familiar with that or with Bronson's; they are practically the same.

Mr. Pitt: I would like to inquire of the Chairman if he is acquainted with a peach called Early Canada?

Mr. Morrill: I have a thousand trees of what Mr. Harrison, who sent them out, says are Early Canada, but it is not what he has sent out frequently as Early Canada, because it is a freestone.

Prof. Taft: We have a half dozen or so trees that came from Mr. Harrison, and their fruit is not quite free.

Mr. Morrill: Well, just about like Lewis.

Prof. Taft: Yes.

Mr. Morrill: That it what I mean. I call it freestone because you can take the pit out.

Prof. Taft: It is a hardier peach than Alexander.

Mr. Morrill: It is a hardy peach and freer from rot than Alexander, and it is a good producer—handsome, as well as a little inclined to a smooth skin.

Prof. Taft: Yes.

Mr. Morrill: Well, I have a thousand trees of that variety and I like them.

Mr. Pitt: I had a few and they came into bearing in season and were a very pretty peach; they were not clingstones. Do you know anything of the Fitzgerald variety?

Mr. Morrill: Yes, sir; I think I have the first hundred trees that came to Michigan, and I like them very much. They are a peach of the Crawford type, fully as large, ripen between the two Crawfords; are handsomer, have a smaller pit; the trees are robust, and the hardiest tree in bud, when the buds were in normal condition as they were two years ago, that I had in my lot—the hardiest fruit bud.

Q: How about the fuz?

Mr. Morrill: Well, I do not see it; do you?

Prof. Taft: I have not seen the fruit Michigan grown.

Mr. Morrill: Now, Mr. Hale is the only man I ever heard suggest that, and I got a letter from Prof. Beach this year saying there are now two or three kinds of Fitzgerald out—had two or three descriptions. Mine are as free as any of the peaches of that season. I never saw a more brilliant peach; it is of very high quality, and if it lacks in any way it is for shipping long distances. It is not going to compare well with Elberta for that purpose, but it shows a strength of foliage this season that pleases me. Along the lake shore we suffered severely with curl; I never saw anything like it, and Fitzgerald came through the best of anything I had. That was a new experience with me, and I have marked it up in favor of Fitzgerald. I do not think it is going to be as heavy a producer as some of the varieties we have, like Gold Drop and Lewis and a few more of that character, but of the large class of peaches of the Crawford type it certainly is the superior of any of which I know, except Elberta, and has over Elberta the advantage to which I have referred; while I presume that for size Elberta has an advantage over that.

Q: What is the time of ripening?

Mr. Morrill: Just after Early Crawford. In regard to hardiness, that is a very important point. A year ago last winter we had weather 18° below zero, and our buds were not sprung; they were in normal condition all the way through, and I thought it was an excellent time to find out the comparative hardiness of buds. I went through and cut buds of all varieties in my orchard. Of my Crawfords, some 60 or 65 per cent. were killed at that temperature, but the three varieties that I supposed would show the greatest hardiness were Crosby, Lewis, and Fitzgerald, standing almost in adjoining rows; there were just two rows between Fitzgerald and Lewis, and Crosby joined on the other side. I cut two hundred buds of each, selecting at random over a dozen trees, and counted. On Crosby I found 27 dead buds in 200; on Lewis I found 14, while on Fitzgerald were but three. I thought it was a remarkable showing. Last winter we had a different condition of affairs. Along in January we had warm weather that sprung the buds until my neighbors said that in their orchards there were buds that developed to a considerable extent. We had a temperature of 12° below zero in February, and it killed off nearly everything we had. Further north, where it was not so warm in January, they fared better, and I think was not so cold in February. Lewis, Gold Drop, and Fitzgerald were the only things that bore for me this year. Fitzgerald did not come as well through that test as Lewis, but Crosby was killed. It did not show more than occasionally a specimen, and Lewis stood the test the best of anything that I ever saw. Now, there are two conditions under which judgment should be placed, and either condition might change the verdict; but those are things we have to consider, one of the little details of which I spoke.

Q: You raise Chillis, don't you?

Mr. Morrill: I have Chillis; yes, sir; I had Chillis this year, a few, but not nearly so many as I had of Lewis right adjoining.

Q: Lewis stood the test best?

Mr. Morrill: Yes. But take it in this latitude, no orchard is complete without Chilli, and a pretty good proportion of it.

Mr. Croy: Is it not a fact that those Chillis are about the best market peach we have?

Mr. Morrill: For you, yes, sir; for us they are good when they are good, and when they are not they are no good; but they are more reliable at Grand Rapids and north than they are south of Grand Rapids, is my experience and observation—much more.

Mr. Hale, what have you learned in Shelby or in Oceana county in 1897?

Mr. Hale: My experience has been similar to that of those about me in different places. Of course, our crop was nothing like what it was estimated or reported to be. Oceana was reported to have quite a fair crop, and nearly a full crop in the fore part of the season, but it dwindled down to a very small one indeed. It was reported once to be about a third of a crop of peaches this year. We did have a good fair crop of buds in the beginning of the year, but curl-leaf affected us, and so far as the varieties that best stood the test are concerned, Lewis and Chilli were fair crops; very little of Elberta; Barnard was just a fair crop; Snow's Orange was fair, and small fruit—an abundance of it, and very little money.

Mr. Morrill: A gentleman from Oceana told me that he would not be surprised if the majority of Elberta peach trees set in Oceana county would be taken out. Do you believe it?

Mr. Hale: I do not believe it.

Mr. Morrill: He said that curl-leaf had weakened them so that he had an idea there would be a lot of them pulled out—the majority of them.

Mr. Hale: It is a fact that our Elberta trees did not recover so as to look healthy this fall. Every leaf was taken off, nearly.

Mr. Morrill: I do not think they will be planted next spring to any great extent. I think the people are going to wait.

Mr. Monroe: How much did you have?

Mr. Hale: Less than a third of a crop. I do not think, taking the county through, there is over a tenth of a crop.

Mr. Monroe: Take the county as a whole?

Mr. Hale: Yes, sir. There were places having some varieties, especially those that had a large percentage of Early Michigan and Lewis, where they had a fair showing; but take it as a whole, there were orchards where they ought to have had two or three thousand bushels that did not yield fifty bushels, to my knowledge.

Q: Did you learn anything about the value of thinning, this year?

Mr. Hale: We learned the value last year of thinning.

Mr. Morrill: You learned that there were seasons in which you did not have to thin, did you not?

Mr. Hale: Yes, sir.

Mr. Reid: Well, has it called people's attention to that point?

Mr. Hale: Yes, sir; and yet there is one thing that we notice this year, and I would like to have brought out sometime: We naturally thought, this year, having a very spare crop on the trees, that there would be good peaches; and in many places where we look for large, nice peaches, where peaches ought to bear well, we did not have many peaches; the peaches did not pull through.

Q: Did you ever notice that in apples?

Mr. Hale: Yes, I did. Now, is there not such a thing that, if there is not fruit enough, the growth will go into the wood instead of the fruit? These same trees got an enormous growth of wood, but no fruit.

Mr. Morrill: Did you not have the same conditions we did early in the season—starting in April, you had a warm time, followed with weather that should have been in March?

Mr. Hale: Yes, sir.

Mr. Morrill: And did not the fruit set suffer through that and become stunted?

Mr. Reid: Prof. Taft, what do you think causes the condition?

Prof. Taft: I think there are three or four things. I was speaking this morning about the apple. Of course the two were about the same this year, and it seems to me we might go back a little further and say it was a heavy growth last year that exhausted the trees, and the first thing this year was to get back what they lost; as Mr. Hale suggested, it went into the tree, probably. You know that in developing fruit any of the plants will draw from the substance of the limbs and leaves and thus develop the fruit from that, and last year it seems to me it was the enormous crop we had, particularly of the apple and peach, (1896 of course I mean); that the trees did everything they could to develop that crop, even at a loss to themselves; and this spring they were weakened, and the weather this spring of course was against them, and in case of both the apple and the peach we had various leaf diseases that, in the case of the peach (curl-leaf) took off nearly all the leaves in some cases; and in the case of the apple nearly all the season we had a large amount of apple scab on the leaves, so that most of the trees looked as though they had lost three fourths of their ability, and with small amount of ability, in the case of the apple, together with curl-leaf in the case of the peach, they were not able. Besides that, I think the spring itself, being so unfavorable, gave them a shock and thus reduced the size; the trees could not recover from that.

Q: Is there no remedy for curl-leaf?

Prof. Taft: I think it is four or five years since it was found that spraying thoroughly would to a large extent prevent it. Twice, I think, we had the poorest result from spraying we ever had, and I attribute that, as I would also the matter of the failure of the crop, in large part to the weakening of the trees from the previous year. They were so weak that they were subject to disease. All of our plants, if they become weakened, are very likely to have disease, and with that tendency it is harder to keep the disease down. Regarding spraying, I would say that, as for all other fungous diseases, the best remedy is Bordeaux mixture; and, although in some cases I have recommended and have generally used a solution of copper sulphate for the early spraying, I think that perhaps for curl-leaf it would be best even for the first spraying, and just before the buds open, to use Bordeaux mixture, and if we spray thoroughly and cover every part of the tree we destroy a great part of the fungous growth that is there. I like once at least, and would prefer to spray twice, after the leaves come out, and by doing that thoroughly you can in most cases entirely prevent the disease. This year it was so cold and wet that it was very difficult to spray successfully and we did not quite do that; but yet, where we sprayed, we kept the leaves on the trees to a very large extent; where we did not spray, most of them fell off in several varieties, particularly Elberta, and in case of this disease I would more than anything else insist on thorough spraying. If you give the trees a little dash of spray, covering half the twigs, you can not expect to have anything like good results; but by covering every part of the growth you stop that portion of the disease, and if there are any spores there you destroy them.

Mr. Hale: Did spraying keep the foliage on Elberta?

Prof. Taft: Not all of it, no; I could not say anything about the fruit. We did not have any.

Mr. Slayton: If curl-leaf and the poor apple leaves last spring were the cause of the enfeebled buds, made possible by a full crop of fruit the year before, would spraying prevent curl-leaf at all, or the bad development of the apple leaves?

Prof. Taft: Well, it would not, possibly, prevent it; I do not claim it would, but I said that you could to a large extent save the foliage. A weakened tree, as I said, is far more likely to have a disease, and it is only in preventing spread of the disease to leaves that have not been attacked that you have any result in spraying. It was the worst year I ever saw for good results in spraying.

Mr. Slayton: I understood that the heavy crop of fruit the year before caused the enfeebled buds that year, and that was the cause of curl-leaf last spring.

Prof. Tracy: Then the enfeebled buds will make it less possible to stop the effect of curl-leaf and the other conditions. That is what Prof. Taft said, as I understood. Is it, or is it not, true that the degree of this small apple leaf and curl-leaf are very much concurrent with the degree of fertility and the general good care and condition of the orchard; in other words, is it not true that the orchards in which the land was in good heart (as the farmers would say), rich and healthy, that the fruit of those trees did not suffer from this small leaf and curl-leaf?

Mr. Hale: I can not answer that it is, from my experience. I have a good orchard where half of the trees are Elbertas and half Conkling, and it is my pet orchard, so to speak, and I took extra care of it, sprayed thoroughly; but on my Conklings I succeeded in growing a partial crop, and on my Elbertas I could not get anything of a crop.

Prof. Tracy: Was that ground as fertile as you would like to have it?

Mr. Hale: Yes, sir; the ground was in good shape, good ground.

Mr. Morrill: I have pretty strong ideas on both of those questions and there have been strong observations made this year. Take the apple, particularly. Where apples have been in the past uncultivated, in our vicinity, it is noticeable this year that they suffered worse than those that had been cared for. Now, what I mean by "cared for" is not only the fertility cared for but the cultivation and spraying, not only this year but in years gone by. There is one thing noticeable, and you can go to three or four orchards in our county and get an object lesson from this. I will take one, for instance, at Watervliet—forty acres of apples. The owner commenced fertilizing his orchard, probably, nine or ten years ago—feeds hogs in it every year, and grows peas to turn under, and he sprays three, four, and five times; and when he sprays they are thoroughly sprayed, the top of the leaf and the bottom of the leaf and every limb and to the ground is covered with Bordeaux mixture. He sprays at just the right time, not three or four days too late. Now, he has taken seven successive crops of apples from that orchard, and they are good always. This year he sold his at home—his firsts for $2.75 and his seconds for $1.75, in the ordinary Michigan barrel, delivered at the train, the whole crop. Those trees, which are twenty-five and thirty years old, are as clean as nursery stock, in the body, and they have made growth right along each year, right in the face of heavy crops—a good, clean crop each year. Now, this year that orchard did not suffer. I will take another orchard, in my own township, belonging to Mr. Allen Bronson, who has followed the same plan, I mean the complete plan. He does not have off years, and the trees did not suffer this year. He hauled Maiden Blush apples, load after load, on our own streets and they sold for $3.50. He has only ten or twelve acres of orchard, but it was better than a 160-acre farm in our county this year, I believe, for net profit; and he has followed these things right through, and these vicissitudes do not affect those two orchards. There are numerous instances of just that kind. Take the peach, and I believe that the best cared for orchards suffered the worst with curl-leaf. There is a thing that is a little peculiar there. My orchards are certainly well cared for. I cut back severely, and I thin out and treat them according to a particularly defined plan that I have (and a good many other good growers use the same ideas), and they suffered worse from curl-leaf than the orchards not so cared for. I do not say any more that that system is absolutely faultless. I say that, so far as I know, curl-leaf is worse where the trees start that strong growth that comes right out like a mushroom. There are those two conditions, taking the apple and peach, that have come under my experience and observation this year, and I think they are worth talking about; at the same time, I shall not change my method of handling peach trees.

Mr. Hale: I wish to call attention to Judge Russell's orchard. He trimmed it well, and it was a fine-looking orchard, and I believe that later it was the worst-looking orchard in the county. Orchards uncultivated last year, comparatively, near to that, greatly exceeded it.

Mr. Graham: That is my experience regarding the peach, not only regarding trimming but cultivation. Our immediate neighborhood has one grower who says the way to get money out of peaches is to grow them as cheaply as you can. The consequence is, he never cultivates, prunes, or fertilizes, or does anything else. He has a very good piece of land, however. This year he had a good crop of peaches, and he is confirmed in his opinion. He never will put a cultivator in there as long as he lives. But he certainly had as fine a crop of peaches as there was in that country, and he has not cultivated any; he never did cultivate any to speak of. So far as I am concerned, I do not practice this severe pruning—shortening in; but our orchards, with the best cultivation and on the best of land, and I will say also on the best locations, failed to produce anything like so good a crop of peaches this year as orchards on lands not so well taken care of and lacking a long way of being as well located. The past season's experience has knocked our theories as to cultivation, pruning, and location, clear out. I have one orchard of 600 or 700 trees, a nine-year-old orchard. The land is good, and it has had good cultivation and borne four heavy crops, but the location is not what we call good. It is probably twenty-five feet lower than my main orchard at home. This year I had a good crop in that orchard, not only of the hardy varieties, but I had a good crop of Early Crawfords. I have had four big crops (there was a big crop everywhere last year) but this year I got a crop of Early Crawfords and plums, and there were some Oldmixons, which we consider one of the tenderest in bud, a nice crop of Oldmixons, in the orchard. The orchard suffered little or none from curl-leaf. There were no varieties in there that would naturally suffer, such as Elberta, and the orchard all the way through produced a nice crop of fruit, almost, in fact, in every tree, and in a place that we generally consider a poor location.

Prof. Tracy: Do you remember the condition of the soil and the surface, etc., of the uncultivated orchard of which you spoke?

Mr. Graham: O, it was plowed in the spring.

Prof. Tracy: What was the condition in the fall?

Mr. Graham: You can imagine.

Prof. Tracy: You say the ground is rich?

Mr. Graham: It is good land.

Prof. Tracy: It was well covered with weeds?

Mr. Graham: Yes, June grass—a nice crop of June grass.

Prof. Tracy: In the fall of 1896?

Mr. Graham: Every fall, right along from the time the orchard was planted, that was his custom.

Prof. Tracy: What has been the yield of the orchard in previous years?

Mr. Graham: Just fair. We have had several other dry seasons and they suffered very badly with drouth, usually, and I want to say that there is a part of that orchard that has got to be twelve or fourteen years old.

Q: Has it ever produced first-class peaches?

Mr. Graham: They were not first-class peaches—what you would call first-class peaches in a peach year, but they suffered for cultivation and that sort of thing. The experience of the last year in some sections, regarding the care and pruning of peaches, has had quite an effect.

Mr. Morrill: How has it affected you? You consider this an exception, don't you, that may not occur again in ten years?

Mr. Graham: Yes, sir.

Mr. Morrill: You would not bring it up here to do away with our various practices and ideas—the exception?

Mr. Graham: No. I think there was a necessity for it. The trees were weakened and curl-leaf came, and notwithstanding all that even our Elbertas are going into winter this year in elegant shape.

Mr. Morrill: A rather shortage of growth?

Mr. Graham: They have plenty of growth. Last year they went into winter with four or five feet of growth, a good many of the Elberta trees; this year they are going in with ten to fifteen or twenty inches all over the tree.

Prof. Taft: I have seen the effects of curl-leaf, and yet it seems to me we can, if we understand the nature of this disease, explain why it showed itself so markedly during the last spring. Curl-leaf is a fungous disease, and is more likely to attack leaves, provided the weather is cold and wet, when they are half-grown; and you can see that in orchards such as Mr. Graham's or Mr. Morrill's we would have, early in the spring, a strong and very rapid growth coming out, whereas the orchard that was not cared for in the way of cultivation would have a comparatively slow growth, and this growth would be less likely to be injured by disease, and with that understanding of it I think it is plain enough why, in the one case, cultivation seemed to increase the injury from curl-leaf, and it did not show itself very much in the other orchard.

Mr. Graham: You can not get a combination so as to cover all these contingencies. The only way a man can do is to ascertain the proper way to cultivate an orchard in an average season. In such seasons the man that worked and pruned his orchard in the spring to prevent excessive bloom and consequent pollen exhaustion, and subsequently thinned his peaches properly and gave them thorough cultivation and kept that up until the fall, is the successful peach-grower, and you can not get a combination that will cover a season that only happens once in twenty years. The man that goes to work on all of his peach trees or apple trees and gets his growth early in the season, and then utilizes the last half of the summer to ripen it up and get it into winter quarters in good condition, through a system of tillage and continuous growth, is the successful man, and I believe that if Mr. Morrill will go right on with his Breed weeder and his shortening in he will be able to start a bank sooner than the fellow who does not.

Mr. Morrill: Going back to the apple, in the condition that you inquire about, Prof. Tracy, we find that orchards that were neglected have suffered, and that there are hardly any fruit buds on them this winter. Now, this is not normal. Through neglect and lack of spraying by many of our people, they are not going to have a crop, because the buds are not there, while those who have taken this same care I spoke of have got a heavy setting of buds. One of these gentlemen called my attention to that two months ago. Since then I went through my orchard and others, and I found that same condition around in our vicinity—the buds have to be made this year for next year's crop. If they are not made you do not get any crop, and that condition is very apparent there with us. It is good health that wins. It takes good care to bring good health to an orchard.

Prof. Tracy: I have been a little misunderstood in speaking of good care. They seem to refer to the question of cultivation and the degree to which they pay attention to their trees; I refer more especially to the attention paid to the condition of their soil, as to its fertility, to subserving the natural original fertility of the soil and seeing to it that the soil is in such condition that it is most productive. That was the point I raised, more than the question of cultivation.

Mr. Morrill: Well, that is a point, with others, that I consider equally important.

Mr. Graham: I would put this question, Mr. President, practically on the same basis that you would. Now, I would rather have a good thoroughbred horse, for instance, for any ordinary times, than to have an Indian pony, but there are conditions under which the Indian pony would do better than the thoroughbred, and it is pretty much the same way with the orchard that gets no care and the orchard that gets good care. There are certain lines of hardship that a good horse will not stand that the Indian pony will stand; and the same conditions are true, and the same theory is true, with the orchard, but it is no reason which would warrant us in doing away with the good horse and going to using Indian ponies again, or scrub cattle, or anything of that sort.

Prof. Tracy: I say frankly that I have been lying by for my talk on cover crops, that is what I have been doing in all my questions.

The President: Well, that is one of the developments that we should look into very carefully.

STRAWBERRY-GROWING IN GRATIOT COUNTY.

BY MR. FRANK W. BROOK OF ITHACA.

Briefly told, the growing of strawberries in Gratiot county is an infant industry, and the same might be said of other fruit crops, as this county is largely devoted to general farming. During the eighties, one could scarcely buy a strawberry, or other berry or vegetable, in the local market; but now you may find them in endless variety, and largely home-grown. This tardiness in the culture of small fruits is much due to the abundance in which our native berries were obtainable—blackberries, red raspberries, black raspberries, strawberries, huckleberries, and cranberries. But with the onward march of civilization these have been driven out, and he who would have berries now must grow or buy them. Low prices of cereals have caused many farmers to turn their attention to fruit culture, and there is now an interest awakening all along the line of fruitgrowing, with the strawberry well to the front. We have the conditions for successful growing of strawberries and other berries, and we have the progressive and intelligent farmers who will learn the better methods and overcome the difficulties.

Since 1890, culture of strawberries has progressed more rapidly than before. In 1892 the writer sold his crop of strawberries, beginning at eighteen cents per box and but few going at less than ten cents per box. In 1897, with better methods of culture, better varieties, and better berries, he began marketing at ten cents and got down so low as four. Many berries were sold lower. Both seasons gave abundant crops. In '97 the first price was affected by southern berries, and later prices by a large crop at home and a limited market.

In methods of culture we have much to learn, but there are among us progressive growers, well up-to-date, who are profiting by their painstaking efforts. But there are those who turn over five or six inches of the surface soil, rake it over, take plants from old beds that have borne several successive crops in grass and weeds and been subjected to blight, disease, and insects, and without other preparation set them on this ground. During the summer they hoe them once or twice, or have the children do it. They complete the process by picking the few small berries with long stems, putting them in bulk in pail, basket, or box, depositing it over the hind axle of the all-purpose farm-wagon, jolting them several miles over a corduroy and dusty road, and taking for them in the market whatever may be offered; and they invariably complain that they don't have any luck with strawberries. Neither do they attend the farmers' institutes nor meetings of the horticultural society; they take no farm paper; they don't believe in the Agricultural college, "nor book farmers, nohow."

Commercial fertilizers are a nonentity in Gratiot. They are too expensive. Barnyard manure is the main reliance.

A few years ago I purchased a few acres of land which for a number of years had been rented yearly to different tenants, each removing as much as possible from the soil and returning nothing. The ground was bleached out and would bake like a brick. To restore this land to anything like fertility was no easy task. I believed that what the land needed most was vegetable matter—that it was deficient in humus. A heavy covering of barnyard manure was applied, and a crop of early potatoes and early corn grown. After these crops were removed, more manure was applied, the ground plowed, thoroughly harrowed, and sown to rye, which was plowed under in the spring. In short, clover, rye, field peas, hen manure, hardwood ashes, and thorough cultivation have brought this land into condition to raise a fair crop of strawberries. Commercial fertilizers might have done it, but I doubt if they would have done it better. This land has something growing upon it all the time, and green crops are turned under each spring.

Invariably I set strawberry plants in the spring. My plantings next spring will be mostly on ground which produced a crop of strawberries the past season. After the crop was removed, manure was applied, the bed turned under, and field peas sown, which have made a good growth and are yet green. This pea straw will be turned under deeply next spring, and the ground thoroughly harrowed and pulverized with a plank clod-crusher. Then a top-dressing of hen manure and unleached hardwood ashes will be harrowed in separately.

The matted row system is used here almost wholly, and after some experience I have found that the rows four feet apart suit well, and that they should be set mostly from two to three feet in the row. These rows must be perfectly straight to facilitate cultivating. Our beds are set anew each spring and so is every variety. Vigorous new plants are dug, trimmed, and put into a vessel containing water enough to keep the roots wet, and are taken directly to the ground to be planted. The roots are not allowed to become dry nor the plants to wilt. We still plant with a spade, and while there are perhaps better methods we are careful to firm the earth about the plants, and the stand of plants has been satisfactory.

Cultivation is begun at once, after planting is finished, and is done only one way at present. The Planet jr. twelve-tooth cultivator is used, and the slowest horse to be found, and there is but precious little of the surface left unstirred when we are through. Cultivation is kept up constantly through the season, and as soon as possible after every shower. We are not above hoeing, and have not the faith to believe that the best success in small-fruit growing is gained without the hoe's constant use; but in the strawberry field our hoeing is done almost entirely with a steel garden-rake.

For the main crop, Bubach, Haverland, Warfield, Beder Wood, and Burt are planted. Greenville, Splendid, Woolverton, Tennessee, and Bisel are also among the best. Clyde, Glen Mary, Wm. Belt, and Enormous are the most promising among later introductions. Clyde produced more fruit than any other of sixty varieties, and will be given considerable room in our spring planting, as will Glen Mary.

The question of marketing is the most serious one with which the grower of small fruits in this county has to contend. Our county is purely an agricultural region. There is not much of manufacturing, nor any large city within our borders. Being centrally located we must ship overland, and are at the mercy of freight without competition, and express. With larger interests, co-operation of fruitgrowers may help in this direction. A canning factory or evaporators at home might be worth something. With cheap berries, our consumption at home would be much larger, and require no small amount of berries to meet this growing demand. But this will not suffice. There are many who would engage in this industry if satisfied with the outlook for a proper market, and whomsoever shall help us solve this problem will receive our everlasting gratitude.

DISCUSSION.

Mr. Kellogg: You said you pushed the spade into the ground and usually worked it a little to make it clear; if you notice, you get a glazed surface there, practically a puddled surface; if it is a little too wet you will puddle it. Now, you set a plant in that and leave it about two days, then dig down to the side of it very carefully, and you will find that your polished clay surface has parted with its moisture, and you will see some little, fine feeding-roots running down trying to find a crack through which they can get to mellow earth just beyond. In setting plants we have quite a gang of men. When you set forty acres of plants it is quite a trick; we set forty acres last spring. I had a cast-iron wedge made, and we just go along and strike that right into the ground.

We have quite a gang of men on the farm at that season of the year, and I teach them to do these things by drill. In setting strawberry plants most men make just two motions extra. I do not use a spade, I was going to say. If I did use a spade I would require every man to put his hand in and rub that glazed surface all off. Never set a strawberry plant on a glazed surface, whatever you do. In setting the plants we allow the men to make three motions; if a man can not learn to set them with three motions he can not set plants. We discharge lots of men right out of the field. In the first place, the plants are dropped in front of them. We do not allow them to lie there a minute. We have tin cans made purposely for putting them in water just before we set them. We require them to be taken up by the crown. I want the men to pick them up right the first time, and learn to do that right along, so that the roots are all spread out, and then put in two handfuls of dirt, no more—they must fill up with two. I do not allow them to move the plants an inch more than they are obliged to. Draw a finger right through, so as to clean the dirt away from the crown and leave a little hump of dirt on the other side; then we have men following right along who step on those little piles of dirt and press down firmly, so that these little feeders can start right out at once. Mr. Brook said he cultivated at once. We will do a strawberry patch more damage to let it stand on a hot day two hours than a person begins to realize. We have a horse right there and we cultivate immediately—do not even wait two hours. When the ground has been pressed about the plant, perfect capillary action has been established, and the hot sun will injure the plants more in two hours than it can do in three days if you cultivate at once. Do not cultivate over a half inch deep. You will see your plant begin to grow right away, and it will keep that up all through the season. Mr. Brook speaks about the use of hen manure. That is a valuable fertilizer, but more plants are injured by it than it does good, if you put it on in that way. I would put hen manure on at least a month before setting and I would let it wash out. You must not use strong hen manure. I will undertake to say, if you take hen manure and put it on after the plants are set, or just before, without being diluted, it will burn the roots. You must go slow on hen manure all the way through. It is a grand fertilizer, but that is where the trouble is; it is too strong when undiluted. I have come to the conclusion, through my experience, that you do not want any little berries; they are a damage to you, and you do not want them. There is a little apparatus that goes right along and shears the runners right off. The distance to set your rows apart usually depends on your horse. Some horses will spread out over two rows, as they walk, and others walk out straight. We set our rows closely together and use that roller or cutter and cut off the runners; that throws the strength back, makes additional crowns and deeper roots, and you will get all big berries and be able to fruit your bed longer. Do not forget to mulch your berries. My teams are drawing straw now on the forty acres, and every acre will be covered with straw right away. The best thing you can do is to mulch your strawberries in the winter, I do not care if it is sandy land. I have some good sand that we will put that mulch on.

Mr. Brook: Will Mr. Kellogg please explain how he uses hen manure?

Mr. Kellogg: Well, I would do one of two things, if I were going to use it in the spring. I would certainly want it in the fall. I would compost it with other manures. It is excellent manure. One bushel of it will go as far as a big wagon load of anything else, but the trouble is it is too strong any way that you can dilute it. A good way is, if you can get muck that is in proper condition—do not get sour muck or compost it with other manure. If I could not get anything else I would take common dirt, and I would hoe it over, mix it thoroughly, get it fine, and put it on some time before planting. My object in putting it on before is to have the rain dilute it with the soil itself. If you put it on in the fall you should hoe it in and let it lie there. I do not put any manure on in the spring. We are drawing a large quantity now, from Chicago. We have drawn out this fall on 26 acres. We had 37 acres last year. We will have 8 or 10 acres more. We put the manure into a spreader and spread it all over the ground evenly. In the spring we will mix it. I go over my ground about sixteen times in fitting it for strawberries.

Mr. Brook: Do you rake the straw off or leave it on the berries in the spring?

Mr. Kellogg: I have adopted a plan where we have so large an acreage. If I were fruiting all of that I would cover the rows over. Then in the spring, as soon as the ground is dry enough, I would cultivate very shallow, not deep enough to touch the roots, not over an inch, and then I would just rake the straw off over the edge. One of the meanest things to do is to carry a man a lot of strawberries and fill his teeth with sand. The way to take them to your customers is to take them clean and nice, so they will eat three or four quarts instead of one. Go to work and grow fruit of all kinds so that people will eat it—everlastingly eat it. If you raise a low grade of berries in a low matted row without being properly fertilized and fed, a man eats a little dish of them, but he never passes his plate back, and of course you will have a glutted market. I say there has not been a time this year when a man who went into the market with real good berries could not sell them and get money out of them. But there are a few little things of that sort that you must do right. Go to the horticultural meetings and find out; that is the way I do.

Mr. Brook: Just one more question: This hen manure of which I speak is composted with swamp muck.

Mr. Kellogg: Well, that is all right.

Mr. Brook: And worked into the soil at different times.

Mr. Kellogg: Yes, different times, that will do.

Mr. Brook: If worked into the surface soil or below the surface soil, will there be any element of fertility lost after it is in the soil?

Mr. Kellogg: No, sir. The soil will absorb the nitrogen, and that is the value of the hen manure—the nitrogen in it.

Mr. Pitt: I would like to ask Mr. Kellogg what is the trouble with strawberries when they grow very large vines, but do not bear any berries?

Mr. Kellogg: My friend told you about that. You take an old, exhausted berry plant that is run out and has lost its fruiting, breeding stamina, and you will not get any good berries. The plants are incapable of bearing fruit. In growing fruit the plant is simply breeding, and it will breed itself to death; and after it has bred itself to death it will make foliage, but has no stamina to produce fruit. Now, all this fruit and the flavor in it largely depend on the stamina of the seed, and right there is one point of which I wish to speak. As soon as the weather in spring becomes warm, the buds begin to swell, and in a few days they come right out. If then you take the dirt all off the roots, without any resource for them to draw on, you ask them to go through the exhaustive process of pollen secretion without any resources except the food already stored in the plant; and you injure the plant more than by any other neglect of which you can be guilty. On our forty acres last spring we had about fifteen to twenty men, and I watched those plants. We cut over them two or three times. Make an experiment: Let a lot of plants shed all the pollen they have; then take a row right beside them and cut the blossoms off before they get through the process of pollen exhaustion; then go and see the fruit you get. You will never let any more plants exhaust themselves by producing pollen excessively in that way, as they will do. Cut most of it off—it is drawing on the resources of the plant. Next year you will get a big crop; and if you carry that out they will last two or three years longer. I believe you can pick a big crop of berries one year longer by cutting off. That is one of the points I wish to emphasize particularly. I cut off the blossoms the first season and thereby get a better flavored fruit.

Mr. Morrill: There might be other reasons for this, but that would be one good reason for it.

Mr. Kellogg: Your ground seems to be rich in nitrogen. Did you get any fruit at all?

Mr. Pitt: Yes, sir, some very nice berries, and the plants I got were selected plants, very nice plants, but they seemed to grow all to foliage.

Mr. Morrill: What variety?

Mr. Pitt: I had Bubach and Jessie, but I had several varieties I can't remember.

Mr. Morrill: Jessie is liable to killing by frost.

Mr. Kellogg: I would not set Jessie.

Q: Parker Earle, how is that?

Mr. Kellogg: Sometimes the first berries of Parker Earle will have stamens, but later on they do not have stamens. I would not use it. On some grounds sometimes it will work. It depends on how it has been treated. If the blossoms have been cut off the stamens will gain strength.

Q: Did not the berries set enough, or they did only not grow very big?

Mr. Pitt: The berries were of good size, all of them that I got, but they were few.

Mr. Morrill: Did they bloom plentifully?

Mr. Pitt: No, I do not think they did.

Mr. Kellogg: They will bloom just as full, make just as large a blossom and as much fuss about it, as though they were going to grow a big crop of berries, but the blossoms all drop off unless there are perfect flowers near them.

Mr. Morrill: How do you cut blossoms?

Mr. Kellogg: Well, I just take a pen-knife and get the cluster with the finger, like that, or reach in.

Mr. Morrill: You do it with your men, don't you?

Mr. Kellogg: Yes, sir, I do.

Mr. Morrill: Just take a pair of sheep-shears and you will never pull a plant.

Mr. Kellogg: I tried that. You may train your men to use them, but I tell you they will not get down there, and they have to adjust it; but they take a knife like that, a thumb and pen-knife, and they can just reach right in there and do it.

Mr. Morrill: I guarantee you some of them will start the roots.

Mr. Kellogg: No, you will not if you use a sharp knife. They are pretty tender when they are small; after they are big and blossomed out and get long stems you must look out. But the way we put plants in you don't start the roots.

Mr. Slayton: I do not wish to discount anything Mr. Kellogg has said, but I move to amend. I wish to encourage everybody to raise as many strawberries as their families can eat, or else buy them. I once set 220 plants. Within eight weeks I picked eight quarts of strawberries from those plants. The next spring I picked four bushels and four quarts from them; with proper care and cutting off all runners, the next spring I picked four bushels and two quarts; the next spring I picked over three bushels and a half; and the next spring they bore a fair crop. That was on sandy land in the village of Whitehall, on the first plateau, above the level of the lake twenty feet, where, if you dug down two feet, you would come into white sand the same as on the lake shore.

Mr. Morrill: You have no evidence but if you had taken the blossoms off the first year they would have borne ten, have you?

Mr. Slayton: No; that is Mr. Kellogg's part of the story. I will simply say that the four bushels and four quarts, when there was plenty of cream and good white sugar, went well enough.

Mr. Morrill: I have no doubt but you would have gotten ten if you had taken the blossoms off the first year.

Mr. Croy: I wish to say, for the benefit of Mr. Pitt, that some years ago I had five or six rows of strawberries in my garden. They were Bubach. Well, I hoed and I cut runners off, and I fertilized, and I did everything I could; I worked hard. I was left like Mr. Pitt. I did not have any berries to reward me for my labors. I became discouraged. I went down to Mr. Mason's. "Why," he said, "I will tell you what is the matter with your berries. You set a perfect-flowering sort along with them and you will have berries." I got some plants and set them out, and the next spring I had bushels of berries off of those Bubachs. That is what is the matter with those plants. You should get some perfect-flowering sort and you will have berries.

Mr. Morrill: He speaks of having Jessie. We found Jessie an excellent pollenizer for Bubach.

Mr. Kellogg: The pollen seems to be weak in Jessie. Some years there is no potency to it.

Mr. Morrill: So far as that is concerned, I would rather have Michel Early than any of them.

Mr. Croy: If you do not have any frost very early in the spring, Jessie is all right; if you do, it is all wrong.

Prof. Tracy: I wish to say a word regarding one thing Mr. Kellogg suggested from his experience—that the family which sat and just stuffed strawberries all the time, did so for his benefit, and I have had somewhat the same experience in regard to vegetables. I am so situated that I have an opportunity to produce vegetables fresh from the garden, and this has been an experience that has occurred time and time again. I have asked parties if they liked tomatoes, for instance. They said they did not care for any. Well, I sent some down, and in a week or ten days or two weeks those people seemed to be doing just as Mr. Kellogg's friends did—it just seemed to me they did nothing but stuff down tomatoes; what in the world they did with them all I could not see. The same has been true with celery, beets, and many other vegetables; and I will tell you, my friends, I think there is one thing in which we can accomplish a good deal in any community, and that is by a change in our method of marketing. I do not know that it is a good thing or a prudent thing or a politic thing to say here, but I think there is no marketing arrangement which is more unfortunate than the ordinary way of disposing of vegetables, the ordinary way in which people in the villages and towns get their vegetables and fruit supply. The farmer grows some and brings it to the grocer and the grocer sells it when he can. The people at the homes know not when he has it, and if they go down town and they happen to see it (it may be two or three days old, but it seems to look nice) they get it. Now, I think there is a great future and a great possibility of increased production of all sorts of garden products, not alone these small fruits and vegetables, if our farmers would drift back into the old way of supplying their customers direct—bringing the products in themselves and leaving them at the place of residence and taking orders directly from the people in the village, delivering them in that way. I have never known of an instance where this has been carried out but consumption has been increased enormously. There are very few villages of this size in this state but the majority of the houses have land enough adjacent to them to supply the family with an abundance of vegetables, and of vastly better quality than it is possible for them to get in any other way, if they only knew how to do it. If we could but interest our people in this town or in any town, in this matter of gardening, visiting the people so that they could take a real, healthy interest in the matter, induce them to put upon their tables fresh vegetables, such vegetables as it is possible to produce, I tell you the consumption would be increased enormously, and we would have a remedy of the trouble which has been suggested, of a glutted market, because the people would use them. The consumption would be increased, as I say, vastly, and the advantages would be so evident to everyone that they would be very much pleased, and it would be for the health and general good of the community, I am sure.

GRAFTING AND ITS EFFECTS.

Mr. Haring: I would like to ask whether it is possible that grafting a tree that is decaying and dying would revive it?

Mr. Slayton: No, sir; unless you cut off all the decaying part, unless you went clear back to the root.

Mr. Kellogg: Grafting is simply transposing new life to the tree.

Prof. Taft: It would be no use unless you had a good sound root and trunk to graft upon; that is all there is to it.

Mr. Morrill: This is a question which might be capable of a little different interpretation from that which people might give who were listening. We all understand that there comes a time in the life of an apple tree, if you please—and I presume that is what you have in mind.

Mr. Haring: A pear tree is what I have in mind.

Mr. Morrill: Well, that is quite another thing. If an apple tree has ceased to bear good fruit and is comparatively going into decay, if you turn in and graft it you may reap three or four or five crops of nice fruit, but the process of decay is going right on and you are simply taking advantage of what little life is left. That is possible.

Mr. Slayton: Your new top will look vigorous and well and may produce some fruit, but the tree decays right on.

Mr. Morrill: Now, a peach orchard that has ceased to produce good fruit and is comparatively going into decay, can be cut back three or four years and a new head put upon it, and apparently the vigor renewed for a short period, and produce the finest kind of fruit; but it simply squeezes the last bit of life out of it. The decaying goes right on, but it is often good practice.

Mr. Haring: I believe my experience might be of some value to you. It was probably twelve years ago that I had some grafting done on the farm, mainly in the pear orchard, and I had a pear tree of the Sheldon variety. It did not bear very well and I concluded that I would change the fruit and graft a Flemish Beauty scion upon it. I did so. The next year, I noticed that the bark on the southwest side of the tree sluffed off, and that the wood underneath that bark was wonderfully decayed. I said to myself, I never will have any profit from that graft or from the tree itself. I did not suppose I would. The tree at that time, I think, was about the thickness of a stove-pipe or nearly so, and today the heart is mostly gone, and I believe that the shell of the tree at the very thickest point is not to exceed three inches and a half or four inches thick, but it seems to be growing together again, leaving a hollow in the center of the tree where the heart formerly was or seemed to be, and the graft is a very vigorous one. We have harvested from three to four bushels of nice Flemish Beauty pears from that one graft.

Mr. Stone: How old was the tree when you made the graft?

Mr. Haring: I could not say, for it was set before I owned the farm. I have had the farm now for nearly twenty years, and it is a profitable tree today.

Mr. Kellogg; Is it not decayed where the graft is?

Mr. Haring: Yes, below the graft.

Mr. Morrill: That is a peculiar condition. It was winter-killing from the sap starting and freezing. There is no question about that. The tree itself was suffering from an injury rather than what we ordinarily would term decay, and this decay has resulted through the injury; there was a starting of the sap in the winter previous to that, and freezing, which had caused the decay, and so far as that section went it injured the tree. It decayed, but there was a portion of your tree that was not injured at all, perhaps.

Mr. Haring: O certainly, I should think probably two thirds.

Mr. Morrill: The tree was not going into decline, but it had met an injury.

Mr. Haring: I have always been inclined to believe if I had not grafted that tree it would have been dead long ago.

Mr. Kellogg: The graft had nothing to do with it.

Mr. Kellogg: Let me explain that graft. Take a scion and set it into a new tree; it is a parasite, just simply a parasite there. Now, this individual that you put in there forever remains an individual, separate from the tree just as much as a plant is separate and apart from the ground. We have discussed that question for years in our horticultural societies and no one has ever introduced conclusive proof that the stock has any influence on the graft, any further than to furnish it nutriment. There are two individuals, one individual producing the new pear you grafted there, and they will produce the two fruits right up to that point, but the one is simply rooted in, just the same as a cutting is in the ground. There are two individuals, one a parasite living on the stock and the other living in the ground.

Prof. Taft: I think the president was exactly right in what he said, that in this case the graft did not in any way affect the growth of the tree. I think myself if that tree had been cut back for grafting, it would have made just as good growth as it did using the two varieties. I think there is an effect of the graft sometimes. Suppose you have a very weak variety for a stock. If you graft on that some strong, healthy kind, that may make a growth and supply foliage to the tree, you will get increased growth. In the case mentioned, I do not think the graft had anything to do with the tree.

PRUNING PEAR TREES.

Mr. Croy: I wish to ask Prof. Taft if he would recommend the cutting back of pear trees. If so, how much of each year's growth?

Prof. Taft: It depends. In case of dwarf pears, as a rule, I would cut them back anywhere from a half to even three quarters, and in the case of standard pears it depends on the growth of the varieties. On very strong varieties I cut back often three quarters; if they are round, hardy kinds, of short growth, I would reduce that amount; but I do, in the case of young pear trees, for a number of years, cut back the growth anywhere from a fourth to a half or even three fourths.

Q: For how many years?

Prof. Taft: I believe even after they get to bearing they ought to be cut back some.

Mr. Slayton: Until bearing checks the growth, would you not?

Prof. Taft: Yes, sir.

Mr. Slayton: A tree in that condition is something like a man having a hundred sheep and only feed enough for sixty. Had he better keep the hundred or cut off forty?

Mr. Kellogg: Mr. Stearns always cuts back, as I understand it; he has practiced that for years, and, as I understand, Mr. Morrill does his orchard, too.

Mr. Morrill: Yes, and my peaches and plums.

FRUIT STORAGE FOR THE GROWER.

BY PROF. L. R. TAFT, MICHIGAN AGRICULTURAL COLLEGE.

With the increased attention paid to the growing of pears and grapes, and in some sections to the growing of apples upon a large scale, a demand for information as to the best form of storage-house has arisen. As a rule we do not believe it will pay the average grower, even though he may have extensive orchards of winter varieties, to put up extensive storage-houses, with the idea of carrying all of his fruit over until spring with the hope of then securing an increased price, as it will ordinarily be better for him to ship it as soon as possible to the city where he expects to sell it, and have it stored in some of the commercial cold-storage houses, where it will have better care than the grower can hope to give. The time may come when there will be co-operative cold-storage houses in some of the more important fruitgrowing sections, under the control, perhaps, of a fruit exchange or other shipping association, but at best they will not be in many localities, and few can avail themselves of them. Even though one does not intend to keep fruit until spring, a packing-house of some kind is a necessity for every large grower, and if it can be so constructed that fruit can be kept in it until the middle or last of December, it will permit the grading and packing to be done upon rainy days, or after the other work is over. If such a building is available, the fruit can be carried from the orchards in baskets, boxes, or barrels and stored until attention can be paid to its sorting and packing. This will be better than leaving it in piles upon the ground as; aside from the danger of injury from frost, the heat of the sun and the ground will hasten its ripening and shorten the keeping period. When possible it is a good plan to leave the fruit picked during the day in the shade until the following morning, thus giving it a chance to cool, and then place it in the storage-house.

Ordinarily it will be best to have the storage-house built above the surface of the ground, if a building is to be constructed for fruit alone, although a basement or cellar may be used for fruit, and if built in connection with a fruit-house it will be an excellent place for the storage of roots.

Nearly all fruits require a cool and even temperature in order to keep to the best advantage. In the case of apples, freezing will do little harm, if they are thawed slowly; and if they can be frozen in the fall, kept frozen until spring, and then thawed slowly, they will be slightly injured if at all. If a storage-house can be kept from three to six degrees above the freezing point, the best results will generally be secured.

A room 30x40 feet and 8 feet high will hold 1,000 barrels, and the fruit may be stored either in barrels or bins. If headed up in barrels there will be rather less loss from shriveling, but there will be little difference in the keeping of the fruit. When stored in bins in large masses, provision should be made for ventilating the bins. This can be done by using fence boards resting upon 2x4 scantling for the floor, and forming bins about 4 feet wide of the same materials. This will give a 4-inch air space beneath and on all sides of the bins. Pears and grapes may be stored in trays that can be tiered up and thus kept in a comparatively small space.

A fruit-storage house has for its special requirements such construction that an even temperature can be secured and thorough ventilation provided. For fall use a wooden structure built entirely above ground and supported upon a masonry wall or on posts or piers will give good satisfaction. The joists should be strong and close enough together to bear any weight that may be placed upon them. As a rule, 2x12 hemlock placed one foot apart and well bridged will suffice, if not more than twelve feet long. The floor should be double with building paper between. The construction of the walls will depend upon the length of time the fruit is to be kept. For November and ordinarily through December, a house may be constructed with two-by-six-inch studding, lined on both sides with heavy building paper, sheathed on the outside with siding and covered with matched ceiling on the inside. If well built the six-inch dead-air space thus secured, combined with the non-conducting power of the paper, will serve to keep out frost even though the temperature outside may drop to zero for a short time. Ordinarily it will pay to take rather more pains in rendering the building frost-proof if there is any likelihood that it will be required for use in the winter. This can be done by adding to the thickness of the wall. Two to four 2-inch dead-air spaces and a corresponding increase in the number of thicknesses of paper and sheathing will generally suffice. Instead of using lumber for separating the air-spaces, it may be done with paper alone. In the construction of the new storage-house at the Agricultural college, the plan of construction was the same as outlined above, except that on each side of the four-inch air space two one-inch air-spaces, separated by heavy building paper, were formed; care was taken that the spaces were indeed "dead," and all laps of the paper were made at the furring strips, which were placed every sixteen inches over the studding, and every thirty-two inches horizontally. These not only held the paper firmly in place, but divided the air-spaces into small cells, and thus checked the tendency of the air to circulate. The air-spaces between the vertical studding were also divided into cells.

It will be noticed that no packing of any kind was used. Sawdust has sometimes been used, but it is not satisfactory, as it absorbs moisture, and not only decays itself but causes the rapid decay of the building. It soon settles down and becomes a poorer non-conductor than air alone would have been. Mineral wool is sometimes used for refrigerators, and gives excellent results, as does charcoal and other non-conductors. Of the materials available for the purpose, nothing is better, if any packing is to be used, than soft-coal ashes free from clinkers.

One side of the college store-house has been constructed in a variety of ways, in order that by means of thermometers we might test the value of the different methods of construction. Among the points we wish to solve are the value of the paper partitions in the air-spaces; if it pays to divide the air-spaces into small cells, and whether it will be best to pack the spaces with cinders, or use them as dead-air spaces only.

Every one has noticed that on a sunny day the siding upon a building often becomes very warm. As wood is a fair conductor of heat, the temperature of the air-spaces inside must be affected to some extent and the temperature of the building itself will certainly be increased. In order that any excess of heat might be carried off from the outer air-space, it was left open above and below. By closing the spaces in winter an additional dead-air space is provided. As thus constructed, the walls are about thirteen inches thick, and contain one four-inch and five one inch air-spaces, and are formed of five thicknesses of lumber and eight of paper.

The window sash should be double, and outer wooden shutters should be provided. The doors should also be double, and for winter use there should be some sort of vestibule or ante-room. While doors made of two thicknesses of ceiling, with paper between, will be fairly warm, it will be better if the outer and inner layers of ceiling are fastened to a framework of 2x4 scantling, and better yet if the four-inch air-space thus formed is divided by layers of building paper separated by thin furring strips. By providing two or three shoulders upon the sides of the door, and corresponding ones upon the jamb, the opening can be made air-tight.

The floor above the storage-room should be made frost-proof by means of one or more air-spaces and several thicknesses of paper.

Ventilation can be provided in various ways. An air-shaft leading up through a cupola at the ridge is desirable, and air can be admitted through the windows and doors, but it will be better to have some special provision for admitting the air. Chutes of tile or wood can be arranged to carry air through openings in the foundation up through the floor, or a line of eight to twelve-inch tile can be laid three or four feet underground to a point eight or ten rods from the building. The temperature of the air will thus be modified by that of the ground, being cooled in summer and warmed in winter. Whenever the air inside is warmer than the exterior air, there will be a current upward through the ventilating tube, and cool air will come in from below. By leaving the chutes open on cool nights or on days when the house is warmer than the outside air, and closing them when the outer air becomes warmer, a fairly even low temperature can be secured.

It often happens that one has a basement beneath a barn or other building that can be used for the storage of fruit, but even though the walls are double, or so banked with earth that they are frost-proof, the best results can not be obtained unless the walls are in some way insulated so that the warmth from the ground can not affect the temperature of the cellar. An inner wooden lining with one or two air-spaces and several thicknesses of paper will cut off the ground heat from the sides, while a wooden floor, or one of cement or brick covered with planing-mill shavings, will lessen the amount from below. Even more attention should be paid to the ventilation of a basement storage-room than of one above ground, as at best some heat will be absorbed from the soil.

During winter a properly ventilated house can be maintained at about as low and as regular a temperature as when ice is used.

As can be judged from the above, we do not believe that the ordinary grower should go to large expense for an ice storage-house for fruit, but it often happens that if some of the late summer and fall varieties of fruit can be kept a few weeks, or sometimes a few days only, until a glut is over, a greatly increased price can be obtained. As the use of ice is becoming quite common on the farm, it will often be an easy matter to arrange a small room at one end of the ice-house for this purpose. Ordinarily it is best to have the room to be cooled below the level of the ice-room, with openings so arranged that the cold air from the ice can drop down into the fruit room, pushing up the warmer air, which will pass over the ice, thus completing the circulation. Good results can be obtained with the two rooms upon the same level, if the arrangement is such that the cold air can flow into the fruit-room and the warm air can find its way over the ice.

DISCUSSION.

A Member: I would like to ask Prof. Taft what the temperature of the ground about the tile may be expected to be?

Prof. Taft: It depends upon how deep the tile is, of course; if it is only shallow it will drop down to the freezing point, but for the most part the tile I laid are four to eight feet deep. The tiles go in about a foot below the cellar bottom. I have a cellar, as I said, and only the lower end is at the frost line. I expect to find that it does not drop at this depth under 40 degrees. It has been from about 50 to 55 up to the last week. I have not the records for the last few days, but it ran about 50 degrees.

Mr. Morrill: What is the best temperature for apples?

Prof. Taft: I like to get it down to 35 degrees, or even a little less. I mentioned about 38 degrees as best for a house of this kind, because there will at best be some variation. Suppose we have a fairly warm time and have managed to hold the temperature down as low as 34 or 35. If we happen to have a change of 50 degrees, as we might, there is a chance that we should lose more than the small margin we have allowed ourselves; but if it be kept at 38 I think that gives us enough margin so that we can stand a very great drop in temperature. As a rule the nearer to the freezing point the temperature can be maintained the better.

Q: Did you ever see apples frozen all winter? Prof. Taft: Yes, sir.

Q: What was the result? Prof. Taft: Well, if they were frozen all winter they were all right; but when they freeze in the fall, and thaw out once or twice, there is more or less injury. I have seen apples that were kept where the sun could not strike them and where they remained frozen, and they came through all right. You will often find them in orchards under the trees, where they have been covered by leaves; and if you can only keep them frozen, as I said in the paper, that is all you have to do.

Prof. Waite: You board up your building, your wall, five times.

Prof. Taft: Yes.

Prof. Waite: Then you have five air-spaces? Prof. Taft: Six air-spaces.

Prof. Waite: Is it absolutely necessary to have as many as that?

Prof. Taft: I think so, when the temperature drops down to 25 degrees below zero.

Prof. Waite: That is for an extreme.

Prof. Slayton: What is the full thickness of the wall with these spaces?

Prof. Taft: It is about thirteen inches thick.

Prof. Slayton: Would there be anything gained by having those air-spaces larger, all of them four inches, for instance?

Prof. Taft: Yes, sir; but it makes it a very clumsy wall. I have known houses to be built with two four-inch air-spaces. I have, you see, practically that; I have a four-inch air-space, and four one-inch air-spaces. I thought better to divide the spaces and make them as I have, of small size, than to have them all in one wide space.

Mr. Slayton: If you built them a little larger the expense would only be for the studding.

Prof. Taft: That is all; I think, though, that so far as expense goes it would be cheaper to build it this way, and I would rather have four one-inch air-spaces separated by building paper, than to have a four-inch air-space.

Q: Do you think it would be better not to have it packed with sawdust?

Prof. Taft: I would not use sawdust at all, as it causes the decay of the lumber, and after settling is a better conductor than a dead-air space.

A Member: I have built a cold-storage house here in this town. I left a four-inch air-space and packed this with sawdust. We put on a two-inch air-space on each side, but found that the packing was not very good.

Prof. Taft: I would not use sawdust at all.

Prof. Waite: That is pine sawdust, is it?

Prof. Taft: Ordinary pine sawdust. We sometimes have to use hemlock or something of that kind.

Q: How about a building that has artificial heating?

Prof. Taft: In what way?

A Member: Well, I have been building a house for hot-storage, to hold heat in, and I tamped the wall with sawdust.

Prof. Taft: I would leave out the sawdust, and if I were to use any kind of packing it would be cinders, as I think they are best of all. I introduced them in a portion of this wall, and am keeping a record of the temperatures, but as yet I see little difference between where the air-space is packed and where it is not.

Prof. Waite: Well, I believe the air-space is the best, if it is really dead-air.

Prof. Taft: I have taken particular pains to have all the joints come over the studding, and if I happened to make a hole in the paper I patched it. Every space, so far as I know, in the house is air-tight.

Prof. Waite: How about the use of paint or plaster or something of that kind to improve the air-tight qualities?

Prof. Taft: I do not think it would have any great effect, because the ceiling is nailed closely against the paper. In every case the paper is between two thicknesses of boards. You could of course seal it up and make it, as you would say, air-tight.

Q: Do you put the paper between the boards, do you say?

Prof. Taft: The studding is put up, the paper is stretched on that, and the ceiling is then nailed on; the paper is between the boards and the furring strips, or studding, so that every joint is air-tight.

Mr. Kellogg: With the paper nailed to the lumber, would not the shrinking and swelling of the lumber tear the paper? On my house I put it on in that way once, and it tore the thing right in two; the paper did no good at all.

Prof. Taft: There is no chance for this to happen, because it goes lengthwise of the house. My house is thirty feet long and there are thirty feet of paper.

Mr. Kellogg: If they should swell they would be likely to tear it loose.

Prof. Taft: That is true, but in this case there is no chance for it.

Mr. Kellogg: I would guard against that.

Prof. Tracy: We had last year on our farm between eight and nine thousand bushels of onions which we wished to keep till spring, and did so very successfully by means of a building which I will describe, as it may furnish advantageous hints to others. First we built bins about one foot deep and over each other so that the bottom of the first was about eighteen inches from the ground and the bottom of the second about two feet above that of the first, and the top one some eight feet from the ground. Into these bins we put our onions, then we built a house around them in this way. We stuck two-by-fours about ten feet long into the ground about two feet from the bins, and on them nailed common barn boards running horizontally, and on this nailed double thickness of cheap tarred paper, and over this another layer of boards running vertically. The roof was formed in the same way—two-by-four rafters, horizontal boards, two thicknesses of tarred paper, vertical boards. Our object was to make an air-tight box, and we succeeded much better than one would think possible in such a crude way. There was but one small door into the building, but in building the bins we had left a space about eight feet wide open in the center, and in the center of this we built a nearly air-tight shaft about eight feet square at the bottom, tapering to about four feet square at the top and passing through and some five feet above the roof. This shaft had openings closed by trap doors on each side at the bottom and another set just beneath the roof, while just above these upper ones there was a diaphram which could be opened or closed. There was also a door on one side. In this shaft we set up a small stove, the pipe passing up through the shaft and out through the covered top. We filled the space between the top of the onions in each bin and the bottom of the bin above it with loose, dry straw, and also covered the onions in the upper bin with the same material. We had a number of thermometers in different parts of the house, and on the approach of cold weather we would build a fire in the stove, close the doors in the diaphram, open those at the top and bottom, and in fifteen minutes the air would be circulating into the bottom of the shaft, up through it, out over the top of the onions, down the outside space under the onions to the shaft again, and in this way a very little heat would keep frost out and we were enabled to keep a very even, low temperature. Some of the onions were frozen when we finished the house, and forty days later they were still frozen, though none of the others had frozen at all. When the weather was warm we would open the diaphram and the openings in the upper part of the shaft and close those in the bottom. I never saw onions kept in better condition than those, and the cost of the house was very small. We did not expect to use it only that winter, but it did so well and we found it so valuable to keep roots which were to be set out for seeding, that it still stands. When we want to refill it we simply tear open one side, put in the onions, and then rebuild the opened side.

Mr. Morrill: We understood that between each bin of onions, or each shelf upon which you placed them, from the top to the bottom of the next shelf in that bin—did you fill it with straw so that the circulation would not be through the tiers?

Prof. Tracy: Kept the circulation around the outside; and we found it was very necessary to make that shaft in the middle quite tight. We made it loose in the first place, and we did not get anything like so good results, nor did we get so good results until we put the straw in.

Mr. Morrill: You have practically a circle of bins clear around that shaft, at some distance from it—a little distance.

Prof. Tracy: Well, the onions come up almost in contact with the shaft.

Mr. Morrill: You have a door in that to close or open?

Prof. Tracy: We have a door in the shaft to go through and build our fire. We have a door from the outside by which to enter, and we go right through that door, closing it very closely. The door that we built into the house originally is not directly opposite the door in the center of the shaft, but we go around the path in that way.

Q: What is the size of the house?

Prof. Tracy: It is big enough to contain, I think it was 8,700 bushels of onions. It was quite a large house. I should say it was sixty feet long and I know that it was thirty-two feet wide, because I remember we used two lengths of boards on the ends. The whole idea is simply this: Make an air-tight box, put in the center of it an air-tight shaft; put your fruit in bins in the center of this space with an air-chamber all around between the fruit and the wall, and have free access from this outside passage, or air-space, to the bottom of the shaft, and also have an opening into the bottom of the shaft and one at the top over the fruit. We used that same house this summer to store roots, beets, carrots, etc., which we wished to keep back and set out for seeding and which had been buried through the winter. We wanted to examine each root as to shape and color of flesh, and so wanted to keep them fresh and unwilted for some time, and we were perfectly surprised to see how admirably we could keep the temperature down in that house and preserve the roots until way into the summer perfectly fresh and unwilted. There is another thing of which I wish to speak. I do not think there is any feature of Prof. Taft's house which is more desirable than that ventilating shaft on the outside of the building. I was very much impressed with that when I heard a description of it. The Mexicans use a somewhat similar principle in their houses. Down in Arizona, where I was, during the hottest part of the summer, all the houses of the old residents have false roofs an inch or two above the other, giving an opportunity for the air to circulate, and a great many of the walls are built with just that idea—an exterior wall protecting from the sun's rays, and I think it is one of the most efficient things of the whole system.

Mr. Morrill: I built an ice-house about eight years ago. I had always had difficulty in keeping a small body of ice, fifteen or twenty tons, that we put up for our own use, and I did not wish to build it larger. So I put this same false outside, separated an inch and a half from the main building, just exactly as you do, and I never saw a house keep ice any better, I never saw as good a little house for keeping ice as I have now. Last year, at the meeting of the State Horticultural society of Illinois, Mr. Dunlap had a very comprehensive and complete article on the home storage of apples. There are a good many extensive apple-growers in Illinois, as some of you are aware, and the question of storage was discussed at considerable length. An old gentleman from one of the river counties made the statement that he believed he had the most successful and the cheapest cold storage of any of them; and it developed that he goes into his orchard, makes bins eight feet wide and any length that he pleases, according to the amount of his apples, and just lays boards on the bottom; picks his apples and pours them in until they are six or eight feet deep; lays loose boards across the tops of the bins, and puts a slanting roof over them, paying no further attention to them until spring. He was plied with questions, and I asked him how low a temperature he had ever known there. He mentioned a time a number of years ago when the temperature went twenty-two degrees below zero and did not get up within ten of zero for over a week. The apples came out perfect. He says you could go in the winter and lift one of the boards that just lay loosely across, just enough to shut the light out (that is what he seemed to wish to do, to shut the light away from the apples) but you could not see an apple. He says you see just a mass of frost all over the top of the apples, and he has never lost one per cent. in fifteen years' storage of apples in that way. In response to a good many questions, he was prepared on every point, and he had at least a half a dozen of his neighbors in the audience who testified to the fact that he did keep apples in that way, and kept them successfully, and he has 160 acres of apples. The only objection to it is that one can not go in the winter and take out apples if he wishes to. They must not be disturbed. You must wait until they thaw out in the spring, and then sell quickly. But he stores his apples thus and gets through absolutely without loss, no matter what the temperature has been. When the question was put to him, "But suppose you have a long warm spell, as you sometimes have down there?" He said, "My apples are mostly Ben Davis and Missouri Pippin. They are sound when winter sets in, and then we have a mass of apples eight feet deep. We have simply a single tier of boards (good, tight, matched lumber), and the air can not go through them. There is not change enough in temperature in the bins to ever thaw the outside tier of apples, until it comes settled warm weather. Then they will thaw out gradually," and he says there was a time when he planted his corn before he opened his apple bins. In taking them out there will be masses of apples all frozen together.

Q: Those are waste, I suppose.

Mr. Morrill: No, he says if he gets a bunch like that he lays them out carefully in the shade, and in three or four hours they are comparatively all right, but he knows they will go down quickly. I was speaking to a Chicago commission man about this as I came home. He said, "We had a car of apples on the siding here half of last winter, and we paid track charges on them, because when we went to them (they came from western New York) they were frozen, and we feared if we moved them we would spoil them. One load came up to the store and they spoiled as soon as they thawed out. We expected the apples in the car to thaw, but they did not until in the spring, and we brought them up and sold them in better condition than anything that we had taken from the cars and put into cold storage. There was less repacking." There have been numerous instances of that kind that look as though we do not have just exactly the right idea of apple storage. It is a fact that the cold-storage houses of Chicago hold a temperature of about thirty-five degrees as nearly as they can. Now, if these things occur where they have absolute control of the temperature, it looks peculiar to me that they should not put the houses down to freezing point and leave them there until they want the fruit, and then put it into another and warmer room to thaw out gradually. I never asked the question. It looks to me as if there is something in it for somebody, if it is true. This old gentleman said he filled a piano-box and set it against the north side of his barn and nailed the cover down after having filled it with apples, and he took them out in the spring in perfect condition. There are numerous instances, too, where men have reported having barrels of apples left in out-buildings all winter, where they did not get variation of temperature—that is, where they were not exposed to the sun and did not thaw out as readily when once frozen, and remained so until spring. As the Professor says, if they can be frozen and remain without any disturbance, they will come out all right.

Mr. Kellogg: You put a good deal of emphasis on the fact that they should not be disturbed or exposed to the light and air.

Mr. Morrill: This gentleman says you should not let the light in on them. He makes a square bin and then puts on a roof of boards, but he says where he put some straw on top of some, one time, he lost a lot. He says, "Just keep the light and air from them. Put a slanting roof above so that the water will not run into them, and leave them alone. If they do freeze they will stay frozen until warm weather, and you will have good apples. Keep everything off, and do not touch them nor even look at them." He says he has raised the boards and could see frost six inches deep all over the apples.

Prof. Tracy: I think the best talk I ever gave on horticultural matters was when I was at college, and it was the first year I attempted to say anything about horticulture to students. We had quite a crop of onions that year, and they were put down in the basement of the college building. They were spread out on the floor two feet thick, and after school opened in February they were covered with straw. I do not remember the year, but it was a class of boys that were to study horticulture. I went down there and took the straw carefully off of that pile of onions, and with a stick I wrote the name of that class on those onions, just as they were, and covered them up and left them until the next spring. We did not sell them until late in the season, and when we came to open them, where they were disturbed you could read that "Class of '62" or "'61," whatever it was, in decayed onions. Every onion touched by that stick was decayed or sprouted; there was a row of green and decayed onions just as I had marked it there. Down in Connecticut they have raised a great many onions yearly for two or three generations. They store them almost invariably in out-buildings or barns, in bins, arranged something in the way I have suggested, and I remember very well going with Mr. Wells to a building to look at his onions. The barn door slipped out of his hand, shutting with a slam, and he said that the onions were disturbed and injured by mere noise. No one could have shown more irritation or annoyance and anxiety than Mr. Wells did, as he saw that barn door slam to, because, he said, "That will spoil some onions." The simple idea was that the barn door slamming and jarring the onions while frozen meant to him a loss. That was fifteen or twenty years ago, and that is the sentiment they have there of the importance of not disturbing onions. Now, I think the difference between the success of this man in Illinois and that of a great many others who have apples frozen accidentally, and don't go through successfully, is simply that he builds his on the ground. He has a perfectly stable body, it is not disturbed by winds, it is not disturbed in any way, and even when he took his piano-box he put it up against the barn where it was likely to be steady, and I think one secret of his success is in not moving them when they are frozen. Let me tell another instance: I had, when I was a boy, a plant of which I thought a great deal. It was an abutilon. It froze hard enough so that it was cracked open. I took it with the utmost care, without disturbing it, and sat it in a room and thawed it out slowly, and it did not seem to be hurt by the freezing. I took the greatest care not to disturb it, not to shake it. I accorded it a good deal more attention than I would a basket of eggs, made every effort not to jar it in the least; and I think frozen vegetation, if allowed to thaw where it is not disturbed while the ice particles are in the various cells, will go through a good deal more freezing than we suppose.

Prof. Waite: This question of freezing and thawing of fruits and plants brings up a very interesting theory that has been brought forward to account for it, and which possibly may be of interest to the members of the society. It goes back to Nagle's theory of the structure of vegetable tissues.

In the first place, you know that vegetable tissues, such as that of an apple or an onion, contain a large quantity of water and also contain solid matter, wood fibre, sugar, salts, and protoplasm, which latter is something like the white of an egg. Nagle's theory is that the solid matter is not evenly diffused through the watery portion, and that even in the solid portions, as in the cell walls and the fibres, the woody portions, the solid matter is in groups which he calls mycellæ. Between those groups of solid matter the water is arranged. The freezing of any mixture, or of at least most mixtures, of water and solid matter, is more difficult, requires a lower temperature, than the freezing of pure water; as, for instance, the freezing of salt water takes a greater degree of cold than the freezing of pure water, so that in the freezing of an apple, onion, or the green leaf of a plant, the formation of the crystals within the solid matter requires a lower temperature than the freezing of water, for the reason that the solid particles hold to this water as long as possible, with a certain degree of strength, and that the water has to be pulled out with a degree of force from them and formed on the crystal. The crystal now slowly forms, be it embodied in the protoplasm or in the cell wall, under tension. The living portions of the plants, the cell walls and the protoplasm, have had a large portion of their water taken out and formed into crystals. If that is suddenly thawed we have a new drop of pure water in contact with living protoplasm and cell wall. The result is death. By the way, pure water is one of the greatest poisons to plant life, if it touches protoplasm. It is a strange thing, but it is true, and if the crystals within the cells are suddenly thawed and the water comes in contact, it dies and rots. Now, what do we have when we thaw an apple out slowly? This tension still remains, the solid portions are still pulling at the molecules of water in the crystal. If the rise in temperature comes very slowly, the moment a molecule of water is warmed enough so that the crystal loosens its hold upon it, it drops back into place among the solid particles; and if that goes on slowly enough there is a slow procession of the water from the crystal back into position in the living tissues, and they come out alive. The cells of an apple in the spring may be thawed out and the actual life of the protoplasm still retained.

Mr. Morrill: And the movement or handling of the specimens during that time has what effect?

Prof. Waite: Well, I do not know; that is rather a new point. I did not say anything about that, purposely, because I did not know anything about it. It is very interesting, it shows that this theory of tension may have something to do with the jars. I thought of that when Mr. Tracy spoke of the jar of slamming the door, that maybe it disarranged the particles. You know the particles of a crystal are laid in definite, geometrical form. For instance, water crystalizes in definite forms, and the different molecules are known by the shape in which they crystalize; that is, the particles go into those crystals in a certain geometrical position, and it is a possibility that this jarring and bruising may start decomposition at some point.

Prof. Tracy: Is it not possible that the water crystal formed in the inside of cells or in the inter-cellular spaces may, under movement of the plant, give mechanical injury to the cell walls, and thus induce injury—is not that a physical possibility? A very slight mechanical movement on the part of a foreign body in living tissue may cause great irritation and injury—for instance, we have embedded in our flesh a piece of hard foreign matter; the slightest possible movement will cause great pain through friction and mechanical irritation to the surrounding parts. Why is it not possible that the injury to frozen vegetable matter comes partly at least from the mechanical injury which results from the hard crystal being formed inside of the vegetable tissue, and thereby in movement breaking through the cells and so tearing them down, as you might say?

Prof. Waite: That would be the actual bruising—the handling and shipping, and that sort of thing. Of course, it would be quite reasonable to suppose that that would disarrange it. Of course, sound is vibration. There is no doubt that even the slamming of a door causes movement to take place within a short distance in all sorts of things. For instance, the movement of a freight train will jar the chemist's balances two or three squares away, and the great astronomical instruments in the naval observatory; they are deflecting the streets for two or three squares around, to keep from disturbing the telescopes, showing that a great deal more motion takes place in the small things we are talking about.

Mr. Reid: Do you suppose that the breaking of those crystals alone, without regard to the rupture of the cellular tissue, would be sufficient to start disintegration or decay?

Prof. Waite: O, I think so; but then I do not believe these jars would break the crystals. I think it would be more likely to occur along the point where the crystal came in contact with the solid portions. In other words, at the point where these molecules would start.

Mr. Morrill: The connection would be broken. Prof. Waite: Yes, sir.

Mr. Morrill: Well, the crystals are very delicate, of course. Possibly the jarring would be sufficient to cause the collapse of those.

Prof. Waite: I should think it would take a very much less disturbance than the cracking of the crystal to break up the connection, as Mr. Morrill suggested, between the crystal and the solid portion.

Mr. Morrill: That would break the crystal, of course, if it broke the connection between the crystal and the tissues.

Prof. Waite: Well, the mere changing of position, perhaps, of a few molecules, is one thing we could see with a microscope. They could not be seen with the naked eye, in an apple that thawed out, but they could be seen microscopically, certainly.

Mr. Reid: I understood you to say that the breaking of the cellular tissue in any way would certainly start decay. My question was, would not the breaking of the crystals alone be sufficient?

Prof. Waite: Yes, the crystals we are talking about now are intercellular crystals. They are small. Of course, the size of an apple cell, one single cell, may just barely be seen on a black surface with the naked eye, and these crystals are within that cell. Necessarily, if you have crystals form rapidly enough to force the cells apart and rupture them, that never could be repaired. It is hopeless; they never could recover. But those crystals are so firm that they could not be broken by any such movement. I do not think they could be broken by that.

Prof. Slayton: When we remember that these cells are as small as one two-hundredth of an inch in diameter; that each cell has a skin on each side of it, besides its contents, how delicate must the cell wall be! When the inside of the cell, the watery part, crystalizes and forms crystals with the sharp angle of sixty degrees, could not they easily lacerate that very thin cell wall?

Prof. Waite: Well, the cèll wall is the toughest and hardest portion of the whole structure. We are hardly prepared to go into the construction of a cell now, but it seems to be inevitable. The fact is, doubtless, that the crystals form at the point where they can form most easily. The point of least resistance, I think, would be in the vesicles or in the cell-sac. The cell consists of three things—a sac like a bladder, a lining of protoplasm (a gelatinous, living substance—the cell wall being merely a skeleton of course), and then a nucleus, a more or less strong fibrous protoplasm reaching from that nucleus to the living lining of the cell wall, all the rest of the cell being occupied by the cell-sac, containing sugar and nearly pure water, and in that watery portion the crystals would form.

Prof. Tracy: In talking of these people out in Westfield, Connecticut, where they have grown onions so long, I noticed that all the buildings were built substantially. They usually have a stone basement. I referred to it, and I was told that they built them solidly because they wished to store onions in them, and that they could not store onions in a shaky building. Their experience had taught them the importance of keeping the onions quiet. We last year stored two or three hundred bushels in what we call our "dry house." It is a building built with a double wall, with paper between it, a fairly substantial building. The onions were stored in the upper story, and when they were taken out there was a marked difference between them and those in our onion-house. They did not keep nearly so well. I had quite a discussion with the man who had charge of the ground. My theory was that the reason they did not keep so well was because of the slight movement which a frame building has when exposed to the wind, as compared with the onion-house, where the onions rested on the ground and had no connection with the exterior wall. I thought that point of not having any connection with the exterior wall a most important element, and the man who had charge of the matter and observed it was of the same opinion; that the absolute quietness, that is, the absence of any movement in any onions that were frozen, was quite a large factor in their keeping so well. I think that if you put such a bin of onions into a building and connect it with the exterior wall, which has more or less motion, you will find more or less decay.

Mr. Morrill: This old gentleman in Illinois said he could not put apples in a building and keep them. He had tried it before he tried this.

Mr. Reid: Is the cellular construction of the onion particularly delicate as compared with other vegetables and fruits?

Prof. Waite: Why, yes. The onion has very large cells, however, and it is a plant which, on account of the ease with which you can always get living cells, has been much used to study cell structure of plants. I think, as compared with the apple, it would be looked upon as more delicate, more highly organized. It is used to get the delicate figures of protoplasm for study. It has very large nuclei. In regard to its hardiness, I am willing to learn from practical men rather than to theorize.

Mr. Reid: If it had a delicate structure it would be more likely to be ruptured? Prof. Waite: Yes, sir.

Mr. Morrill: This question simply resolves itself into one or two methods, at least it has appeared to me so for a year or two; and those are some method by which to store apples so that they will keep; something, as Prof. Taft has said, so that you can get at them and use them at any time; or a method of cold storage by which you freeze them and wait until the proper time comes and then sell. Those are the two plans, undoubtedly, for farmers to use in keeping apples for the market. If we can store them as Prof. Taft has planned, it will be more profitable; but I just threw in that man's experience in southern Illinois, which was so fully corroborated that nobody doubted it, and I know that some large packers of apples believe it; but it is not practicable to care for apples in that way if you expect to go on the market at any time, as you may wish to do.

SUCCESSFUL NEW FRUITS AND FAILING OLD VARIETIES.

BY HON. R. D. GRAHAM OF GRAND RAPIDS.

I have prepared no paper on this topic, thinking it would be just as well, perhaps much better, to talk a few moments. It is one with which we are all more or less familiar, and in this manner we can simply get up a discussion of the question as to failing old varieties and successful new ones. The question of successful new varieties, especially, is one that is subject to many circumstances, many conditions. What is successful in one section may be a failure in another. What I might consider successful new varieties would be very unsuccessful with others. Therefore I do not care to put down on paper what is a successful variety or a failing old variety.

It is a question in my mind as to what failing old varieties may mean. Do we have any failing old varieties; and, if so, what are they? Take, for instance, the apple: We certainly have a great many old varieties in which the trees have failed, perhaps as a matter of age, but if they were planted as new and thrifty trees in virgin soil, with proper care, would the variety itself fail, or has it simply been discarded? I have noticed it in various ways. For instance, a man buys a new horse to use in his business, and he pays a pretty good price for it; he gives that horse, ninety-nine times out of a hundred, better care than he ever gave any other; he gives it a little lighter work and a good deal better care, and if it does as well even as the old horse has done, that horse is all right. He wants some new seed wheat. He thinks his old wheat has not been doing very well; he pays five or six dollars per bushel for a new variety. He will put it on the very best piece of ground he has, say on his summerfallow. He will give it extra fertilizing, extra care, and all that sort of thing; and, if it yields a trifle more than his old variety, that is all right, and his old variety is discarded. Now, is it not true very much the same way with our fruit? The great majority of our apple orchards through the state of Michigan were planted thirty or forty years ago. In my experience it is seldom that going through the country one sees a good, thrifty young apple orchard, although we do occasionally, to be sure. The most of them are old and, through over-bearing, perhaps the want of care or want of fertility or something of that kind, they have ceased to bear and ceased to be good. With the apple more than with any other fruit we have failing varieties, and is it not due to the fact that the apple is a long-lived tree and has borne itself to death, has borne itself out? Some varieties perhaps have not done so, but look at the kinds that we have. The question of good apples, successful new varieties, successful for marketing, or a first-class apple for eating or anything of the kind, is governed largely by one's taste. It seems to me, in looking back a quarter of a century, to my boyhood days, that we had apples that were vastly superior to anything we get now. I remember, for instance, the first we got—the mellow Early Harvest that we used to get, as yellow as gold. Do we get any such apples to-day? It seems to me we do not. Probably it is my recollection and nothing more. Further along, in the fall, Washington Strawberry came, and a large number of other fall apples. In the winter we had Spitzenburg, Jonathan, King, Greening, Newtown, and many other varieties that one scarcely sees today in the market. It is hard to find them in perfection. The few specimens we get are usually very imperfect. In our state we now have many Baldwins. There is no one but what will say the Baldwin is a successful apple in certain lines. At the same time, there is no man here who cares to eat the Baldwin if he can get something else. Ben Davis is still worse in quality. Still, it is a very successful apple. So is Wealthy and many other varieties we have today. Take our summer apples. Oldenburgh is one of the most successful varieties, I think, that we have in Michigan, for a summer apple. Still it is not fit to eat. Red Astrachan is not a successful apple in any sense, so far as I know—and so on through our list.

Are those old varieties failing, or is it the fact that we have gone off on a new lead, that we are looking for something else and have practically discarded them? Who knows of a young, vigorous, growing orchard that is planted with the older varieties—Roxbury Russet, Newtown Pippin, Spitzenburg, King—a lot of those varieties we used to consider No. 1, and do yet, when we can find the fruit? Is there any one who knows of a thrifty young orchard planted to those varieties? Or is it planted to Ben Davis, Baldwin, and those we consider modern kinds?

Take our stone fruits, for instance, our peaches. We do not see that variation. So long ago as I can remember we had the Crawfords at the head of the list of peaches, and are they not at the head of the list today?

In thinking this matter over, I picked up Mr. Lyon's catalogue. In that the Crawfords are rated from 9 to 10 in quality, size, and all that, and double-starred in more sections than any other peach in the list, and it is one of our oldest sorts. To be sure, thirty years ago we had comparatively few varieties, while today we have good ones by hundreds.

When I first began to study the question of peach varieties or to know anything about it, as a boy, about the earliest peach we had that was good for anything was Serrated York. We do not consider it good for much now, but it is just as good today as it ever was, compared with other varieties ripening at the same season. We do not consider it a very good variety of peach; but it is not run out, it has not failed, it is just as good as it ever was by itself alone. Then came Large Early York, George Fourth, Morris White, Barnard, the Crawfords, Beers Smock, and so on. All of those varieties are just as good today as they ever were, notwithstanding they have been propagated and repropagated, probably from inferior stock, for years and years. I say they are just as good today as ever. As compared with some others of the same season they are not, but we have never found anything any better, in my judgment, than Crawford. Oldmixon is still a good peach. It ranks high as a white peach of its class and season. Honest John is still a first-class peach, and a very good market peach even; as to quality it is all right. The varieties of peach do not seem to have run out nor failed in any sense, and the same will hold true of the plum. I know of no old variety of plum but is as good today, as a variety, as it ever was. To be sure, as compared with others of its season it has been discarded in some instances.

Now, as to successful new varieties of peach, we have a great many that are successful, some of national reputation, but far more of local. Through the peach section of western Michigan we have almost discarded some of the old ones. I believe in the lower district, the St. Joseph district, for instance, the Crawfords are practically discarded. Am I not right, Mr. Morrill?

Prest. Morrill: Yes, that is pretty nearly true. A few locations that are just right still plant them.

Mr. Graham: Around Grand Rapids that is not true. Crawford is still one of our chief sorts, and I believe, taking it altogether, no one has made more money from any one variety perhaps than from Crawford. It is one of the chief sorts grown around Grand Rapids still. It produces crops almost as regularly as any variety that we have, and ordinarily brings in about as much money, if not more. But we have very many more of Hill's Chilli; peaches of the Hill's Chilli type have been very largely planted, simply because of their hardiness. It has been a successful new variety, very successful, and probably, take it through the state, in good location, in bad location, good years and poor years, Hill's Chilli has made as much money for the planter as any peach we have. Around Grand Rapids it is not very successful; in our best locations it is not planted to any great extent.

We have some new varieties. New Prolific is a good one (if I may be allowed to put it that way) and Engle Mammoth is a first-class peach, hardy, a good grower, and various kinds of those peaches we have of the same type—Kalamazoo, Bronson, Gold Drop, and two or three more, perhaps I might mention. I believe Kalamazoo, Bronson, and New Prolific to be one and the same thing. They are a class of fruit that is uniform in size and color, uniform in growth, a good market peach, and of good quality.

In regard to grapes, the varieties have not run out; there are no failing varieties of which I know. Of course, we have discarded some. In regard to the old Isabella, it was never good for anything as a market grape, and it is not good for anything today. It is an excellent grape when properly grown, but we can not grow it in Michigan to perfection. Hartford and Champion never were good for anything. Concord, one of our oldest varieties, is still at the head of the list. With all the new varieties of grape that have been propagated, I do not believe there is anything today that will take the place of Concord, not only because of its success over so widespread a territory, but because of its actual worth. We have Worden, a little earlier and thought by some a little choicer in quality; but, taking it altogether, Worden can not be compared as a market grape with Concord, in my mind. In white grapes we have had a great advancement. A few years ago there was not a white grape that could be called a market grape. Today we have many. Niagara I believe to stand side by side with Concord, in its class as a white grape.

With berries the change has been very much greater. There seems to have been failing varieties of berry. The old Wilson strawberry, of which we thought so much a quarter of a century ago, it is almost impossible to grow today to any kind of perfection. I can remember back twenty-five or thirty years ago, when it seemed to me that it took about a million strawberries to fill a quart box, and today just a few will do it. It is either impressions that I received in those days or it is a fact that we have larger berries today. We have a good many new varieties, of course, that were successful, but they come and go. The berry that was the greatest success ten or twelve years ago, perhaps, is not grown today to any extent;

and there again comes up the question as to whether they fail or whether fashions change a trifle, and one variety or another is discarded as the result of the persistent efforts of the plant-growers to introduce new varieties. These things are questions. Still, I do believe there is occasionally a variety of fruit, of berry, that really does run out, as they tell about.

My experience with new varieties is not sufficiently large to give any really valuable talk on this question, and the utmost I expect to do is to provoke a discussion and find out from others what they consider to be successful new varieties.

DISCUSSION.

Mr. Fifield: I would like to ask Mr. Graham if he does not think the small fruitgrower who is cropping his land, especially in small fruits, that after he has grown one variety on the ground and that seems to have run out, and he wishes to make a change, if it is not some times profitable to change the variety and not put back the same variety on the ground?

Mr. Morrill: You may change the variety and not the species: that is, a variety of strawberry, if you please, or to a variety of blackberry.

Mr. Fifield: If a man were growing Sharpless strawberries would it be best to change to Bubach on the same ground, if he were replanting?

Mr. Graham: I think if a variety fails on a certain piece of ground it is because the elements required for a certain species of plant has been taken out of that soil, and I do not know of any reason why Sharpless should require a different element for plant growth than Bubach. I do not believe that would make very much difference. However, I do not believe it is good policy to plant the same species of fruit on the same soil very often. I do believe in changing, of course, occasionally; as, for instance, your soil is sandy and years and years go by, reproducing your plants on sand and planting them on sand. I believe it to be detrimental to the stock, that it should be changed to a different quality of soil; that is, the same variety. I can not see what difference a mere change of variety would make, though.

Mr. Morrill: You believe in rotation of small fruits; as, for instance, do you believe it is possible to change a strawberry patch to raspberries after you have grown strawberries long enough, and change then to a blackberry or currant? Now, I suppose the chemical constituents of each fruit is very similar, but with me the practice of changing from one species of small fruit to another one has not seemed objectionable at all. At the same time, I suppose chemistry will tell us they are very much alike, would it not, Prof. Waite?

Prof. Waite: Why, yes, I think so; but there are so many other factors that would come in.

Mr. Morrill: Yes, it is the other factors that would determine that.

Prof. Waite: The root diseases and things of that sort.

Mr. Graham: I have not noticed it so much with small fruit as I have with large. Four or five years ago I took out an old peach orchard which I think was eighteen years old. It had borne constant, heavy crops; it had been well fertilized from the time the orchard was planted, it being a good piece of loam soil. The orchard was removed on account of old age. About half of that spot was planted with dwarf pears. I think there were 900 of them, and they have done finely, they have succeeded admirably, and seem to be peculiarly free from blight. The other part of the land was planted again to peach trees and they were an absolute failure. I have given it up. I can not grow a peach orchard on that piece of ground, yet the land is good. It was planted to corn and it grew an enormous crop. It has had lots of ashes and stable manure, and good cultivation and subsoiling, but I can not grow peach trees on that land.

Prof. Waite: Was it a peach nursery or orchard?

Mr. Graham: A peach orchard.

Prof. Waite: You can not grow peach after peach, that is it.

Mr. Graham: Well, my pear trees have done better following the peach, and are freer from blight.

Mr. Haring: Why can't you grow a peach orchard on that ground?

Mr. Graham: I do not know why. It is simply a matter of fact that I can not.

Mr. Haring: Do the trees freeze back, or simply not grow?

Mr. Graham: They do not grow.

Prof. Waite: I have often heard that, but I never could fully believe it; that is, that you could not put manure and ashes and fertilizer on the ground and have fruit grow.

Mr. Graham: I know, I think, five different instances in my immediate neighborhood where that has been tried, and every one of them was a flat failure.

Prof. Waite: When do they begin to fail? Mr. Graham: Immediately.

Mr. Reid: There seems to be a difference in that respect, then, from the general practice in Allegan county, of putting a new peach tree right in the place of one that has been taken out for yellows or any other cause.

Mr. Morrill: It may be an old bearing orchard that has exhausted itself, but usually it has been during the first five or six years.

Mr. Reid: Well, perhaps so, because yellows kills out a great many, and yet I have known them to be set right in among old orchards, ten or fifteen years old, the young ones thriving in places where the old ones had been taken out. I do not see why there should be an exception. It is the general practice there. Yet, as the President says, they are likely to be put in among comparatively young trees.

Prof. Waite: Then they are at a great disadvantage.

Mr. Reid: Yes, but they do grow and succeed.

Mr. Slayton: We can analyze soil and think, perhaps, we know all that is necessary for the growth of the peach tree, and we re-supply it again to the soil, and yet the peach trees do not grow. Is it not possible there is something that is necessary in the growth of the tree, in the formation of the protoplasm or something for the cells of the tree, or something unseen like our own spirit or nature, that we do not know and can not supply to the soil, and therefore the soil does not produce the trees the second time, even when we think we have manured it enough—is not that possible?

Prof. Tracy: I would like to inquire, if you please, of those who are acquainted well enough to answer the question, whether it is ever true that upon removing of a forest, any forest, and the re-establishment of a second forest there, the second forest is of the same species as the first?

Prof. Waite: That is due to natural influence that you can not get where it is planted.

Mr. Graham: In this instance of which I speak, especially this matter of my own, the circumstances were peculiarly favorable for the test. In this case I bought the trees of three different nurseries at quite widely separated points. I planted the same varieties on three different farms the same spring. I kept the trees myself, from the three different nurseries, from fall until spring; they were given absolutely the same treatment; they were planted with the same varieties. For instance, there were, I think, two or three hundred Elbertas planted on each of the three farms, and on two of the places where they succeeded all right the land lacked very much of being in as good state of cultivation as on the other farm. It was just ordinary farm land with no special care, on the other two places, while on this it had been given special care and cultivation; that is, it had been better plowed and subsoiled, and so on.

Prof. Waite: How long was the interval between the taking out of the old orchard and the planting of the new?

Mr. Graham: About six months. It was taken out in the fall and we planted the next spring. The old orchard was taken out after fruiting, and taken out by the roots, of course.

Mr. Slayton: Who ever knew a portion of the country to be denuded of its forests and then naturally grow the same class of timber over any large extent of the land?

Mr. Morrill: Why, our timbered lands generally do.

Mr. Slayton: Produce the same kind of timber the second time?

Mr. Morrill: Generally.

Mr. Monroe: From my own observation, not only at home but in places where they have grown trees a number of years, I believe that rotation in the raising of peach orchards is just as essential as in the raising of wheat or corn or any other crop. Of course, I am ready to concede if we had the wit or the wisdom to supply just the right things at the right time and in the right quantities, we might obviate this but we must take things just as we find them. I have in mind quite a number of plats that have been orchards eighteen or twenty years, and I do not know of one that has been set a second time but is a partial failure. On my visit to Delaware a year ago, where they have been in the peach business a hundred years, I do not recall a single case in which I inquired of those old raisers, but they put particular stress upon the importance of cultivating land with ordinary crops four or five years after an orchard is taken out, before a new one is planted. So it seems to me just as clear as in the ordinary rotation of crops, that it is a mistake to plant a peach orchard after a peach orchard that has borne anywhere from fifteen to twenty years; that there should be five, six, or seven years of cultivation of ordinary crops. As I say, I took particular pains to inquire about that point, and I do not recall a case of a grower but put particular stress on those five or six years of cultivation of the ordinary farm crops.

Prof. Waite: You believe it is something besides the matter of nutrition?

Mr. Monroe: O, there are a number of things—of insects and diseases that come into consideration.

Prof. Waite: It seems generally that is the line of thought with the growers on that question. This is of course an old question that has been talked about a good many times. I have always had a suspicion that it may be something connected with the robbing of the roots of the old peach trees; that the fungi that are attacking the decaying roots of the old trees may get after the roots of the newly planted trees. There is another thing that might be mentioned also, and that is that on newly cleared land in Maryland, planting peaches is a questionable proceeding. A great many trees fail on such land. After they take off the timber they like to cultivate the land about three years, if possible, before they plant peach trees. Pears and apples will do a great deal better on newly cleared land that has had only one year's cultivation to put it in order than the peach will.

Prof. Taft: In his talk Mr. Graham mentioned several varieties of strawberry and of apple that had been found practical failures as commercial sorts, and it seems to me there is a possible reason for the failure of those kinds. Years ago we had the Wilson strawberry and it became seriously injured by leaf blight; and it seems to me that that weakness it had accounts for the giving out of the kind. Since that time we have had many new kinds, and the growers are picking out those which they find least injured by this leaf trouble. The same is true of the apple. Many of the older kinds have been, or should be at least, entirely dropped out of our list, because they are so subject to the apple-scab fungus upon both leaf and fruit. The same is true of the pear in some cases. Years ago they grew the White Doyenne in many sections with great success, but now it is a total failure everywhere, so far as I know, except where they spray the trees and keep down this fungus. Regarding Mr. Graham's orchard, it appears to me that possibly there might be some other reason in the orchard where he has replanted. As I understand, the first orchard was destroyed; at least, he found on the trees that died large numbers of the black peach aphis, and it is possible, of course, that they may have been in that soil, coming from the older trees; or that possibly they were brought in on some of those nursery trees, although, as he explains it, that on the other farms there was no trouble, it would seem to indicate that the aphis must have been there previous to the planting of the new trees. That would, of course, account for the loss of that orchard and the success of the others.

Mr. Slayton: I wish to know, in Mr. Graham's estimate of Greening, Early Harvest, etc., of twenty-five years ago, if his younger appetite did not have something to do with the taste of the apples as compared with their taste today, and I wonder if the boys of today, twenty-five years hence, will not estimate our Oldenburgh, Northern Spy, etc.—if their memories will not turn back to them with the same ideas of lusciousness that mine and Mr. Graham's do to the apples that we had twenty-five and thirty or forty years ago. I think lack of teeth and lack of appetite, or something, has much to do with our estimate of fruit. I believe there is no way to produce a new fruit of any kind except by a new birth, and that is only produced by a seed. No budding or grafting, in my opinion, produces a new tree or a new plant. It is only the propagation of an old plant that was produced years ago. The old Greening trees that are bearing today are only parts of the original tree that grew in Rhode Island 150 years ago, and sooner or later they must fail, as every animal, including mankind, has a certain natural life. Some of our plants grow up in the morning and die before night; some of our animals are born at night and die before daylight comes, and you can not make them live any longer. Now, is it not so with the Greening apple tree? We take a sprout off from the original tree and put it into some other tree. It is only a part of the original tree; it is not a new production, it is only a graft of the old cells from the original tree growing in some other soil, growing as a parasite on another plant. By and by that cell life, or whatever it is, it seems to me, must perish, as animal life does when it has reached its proper length of time. Therefore I believe that the Greening and all fruits we now know will eventually perish from the earth. We speak of the Wilson strawberry, and we remember it with a great deal of pleasure and love; yet its natural length of life must terminate soon, if it is not already ended. So it will be with those that are in their vigor today. By and by they will end, they must end; and a new propagation must come from the seed, the only way to produce a new life, in my opinion.

Mr. Graham: We also have deterioration of grains, which are not produced by grafting or anything of that kind, but come directly from the seed. We all remember when we used to grow the old Diehl wheat, for instance. Does anybody grow it today? Those varieties have run out, as we say, and yet they were produced directly from seed—not as part of an original plant.

Mr. Slayton: Just like the nations of the earth—they run out entirely.

Mr. Graham: It has always seemed to me that a graft or a bud, while the bud itself or the scion itself was a part of the old original tree or plant, is supplied with a new life from the new root under the stock upon which it is placed; and, so far as the life was concerned, it was a new life produced from a seed. The life in that stock is what pushes, forces, and sustains the graft or bud, that simply gives it its variation, its quality of characteristic, while the life, the vital force, comes from the new stock, the new seed.

Mr. C. H. Chase: I confess that I know but very little about this matter of fruitgrowing. I just came in as this subject of deterioration came up. I have given a little attention to the subject of biology and to this matter of deterioration. I would like to have some scientific reason given for deterioration of plants. I know of none myself. Of course, there are reasons for deterioration of animals, but in the case of propagation of cell life from a graft, when you come down to the root of the question there is no difference between the propagation of the plant from the graft or from the seed. They are practically the same, they are the continuation of the old cell life. Of course, we have in the lower forms of life the propagation of life by division. The propagation of plant life, in the case of grafting, is a propagation of the same kind. I know of no scientific reason for deterioration of a plant in this manner of propagation. Perhaps somebody here can give some light upon that question. I would like to hear some good reason for it.

Prof. Waite: It has been partly brought out here, but not very clearly, that there are two methods of propagation of plants. One is the sexual method, by seeds, in which the seedling is a distinct individual from its parents, combining the qualities of two parents, the male and female, and differing from either one of them more or less, as a distinct individual. In plants as well as in animals we get the greatest possibility for variation by the sexual method of reproduction. That is where we get our main variation, and by this variation we get improvement; that is, we get individuals which are vastly superior to those with which we start. On the other hand, we have the asexual method of reproduction; that is, the reproduction of individuals by division, by budding or cuttings. The sexual method of reproduction has in some species been lost, and we go on propagating them asexually. The propagation of many of our cultivated plants is purely asexual. Some of the species have lost the power of propagating by a sort of budding process. The question of bud variation and the variation of different branches on the tree is so complicated that I do not care to undertake to discuss it now. It is only under comparatively exceptional cases that bud variation is prominent or striking enough to concern horticulturists. So, to answer that question, we should say that propagation by asexual methods should give a constant stream of individuals, barring the possibility of bud variation, and the whole question then will come back on the asexual method and the question of sexual methods—whether you may, in selecting buds, get inferior or superior ones, and so on. In that case there would be just as much possibility of running the plant up as running it down, by selecting the buds.

Mr. Morrill: That would lead you on to the effect of scion on graft, would it not? Prof. Waite: I hardly think so.

Mr. Morrill: You would drop into that.

Prof. Waite: You might drop into that, too, but I am very much inclined to believe myself that the effect of scion on graft is a mere matter of nutrition. I might add one idea to what was brought out last night. That is, that the nutrition is not merely a nutrition of the top of the tree, of the scion, by the root, but is more strikingly the other way, the nutrition of the root by the top. The assimilation of food, the building up of food material, is all done by the leaves. In other words, the nutrition of the tree comes down instead of going up. Some material is taken up from the roots, mainly water, through which are absorbed the mineral constituents (those come up to the leaves) and in the leaves the assimilation takes place. All the woody matter, for instance, is brought up. It is true, however, that the comparatively small quantities of mineral matter brought up by roots, and all nitrogenous materials that are absorbed in that way, are factors in the development of the plant. They are the things that decide generally how vigorous it shall be; but the actual assimilation of the starch and sugar that go to make the wood and the fruit, the great bulk of the fruit material, is done in the leaves, so that we expect the top to have more influence on the root than the root on the top, and I think that is the case. To come back to the sexual method, by seed, we have great possibilities of running plants up or down, because the seedling is not exactly the same as the parent, and the only wonder is that we can hold our horticultural varieties which are propagated by seed as well as we do. It is a well-known fact that we do not hold them (Prof. Tracy will vouch for this); that none of our horticultural varieties propagated by seeds can, from the very nature of the case, be permanent. They are mere matters of selection each year, and it depends entirely on the skill of the seed-growers as to how nearly a variety is retained to its type, or whether it is improved or whether it retrogrades. Generally they are supposed to improve them, but they do not always succeed in that.

Prof. Slayton: What we know is worth a good deal more than any of our theories, I believe. Now, Prof. Taft gave a little talk on this subject last night. I wish him to try this experiment—I may not live to see it concluded, but I want him to graft a sour-apple tree. Select a long, slim limb, one on which he can graft out fully three feet from any other, and graft a decidedly sweet apple there. As quick as the scion starts, I desire him to cut off every branch for three feet, keep that limb clean, letting the scion form a small top on the end of the limb. Those sweet-apple leaves will form the sap into sweet-apple cells, and the first year will form an outside layer of wood under the bark the whole length of that limb. I wish him to be careful that no buds grow on the limb and keep the scion growing another year. The second year we have two layers of annual growth of sweet-apple wood the whole length of that limb. He may continue it another year and may run another one, so as to have three or four layers of annual growth of sweet-apple wood the length of that limb that was originally sour-apple wood. I wish him to then cut off the entire sweet-apple end. All the sweet-apple leaves of course will go, those that have been forming sweet-apple sap to form the layers of sweet-apple wood. Let him then cut off the end of the limb at least back a foot and a half, and have buds from under the bark back there on the sweet-apple wood with a core of sour-apple wood on the inside of it, and see what those branches will produce—whether they will produce the sweet apples of the outside layer of wood, or the sour, and see the experiment finished. I desire some of you nurserymen to do something with a peach tree. Bud some peach, the Alexander or something, down close to the ground, and keep it trimmed through the first year's growth, so as to run it up three or four feet, as slim as you can get it. Now we have a stem of, say, white peach. The next fall cut that off and bud it up two or three feet high. Bud it to one of the best yellow, decidedly yellow, peaches you have. Let that grow about two years and produce layers of yellow-peach wood, annual layers of yellow-peach wood down the whole length of that stock of white-peach wood that forms the center or core of that stock. Now, cut it off down about two feet lower, and permit buds to form on it and grow some kind of peach. What kind of peach will we have, a yellow peach or a white one?

Mr. Kellogg: Did you ever make that experiment yourself and get a cross between the two kinds?

Mr. Slayton: We do not grow a sweet apple on a sour-apple tree, usually.

Mr. Kellogg: The only thing that comes from the ground is the mineral elements and the nitrogen, that would affect the leaves. I do not believe you can ever get a cross in that way.

Prof. Taft: The gentleman wishes me to try the effect of growing sweet-apple wood around the branch of a sour-apple tree. I wish to ask him what kind of cells he thinks will form around this sour-apple wood?

Mr. Slayton: That is what I want you to decide. The cells are certainly formed by sweet-apple leaves. Prof. Taft: No.

Mr. Slayton: They certainly are. There is no other leaf on that limb or graft, as I suggested, no other leaf except sweet-apple, and if you will let the buds bear fruit they are going to bear sweet apples. All those are sweet-apple leaves, and therefore all the sap that comes down is developed up in the leaf. I do not know whether it is going to be sweet-apple wood that those cells will form, or sour; that is what I wish decided.

Mr. Chase: Prof. Waite, I think it was, if I mistake not, made some remarks on the question I asked, but I do not think he answered the question. The question I asked was in regard to deterioration of plants which are propagated by budding or division. It is true that propagation by the sexual method combines the hereditary traits of two individuals; but still, when you come to the last analysis of the methods of propagation, they are the same, you have the hereditary traits of two sets of individuals which become affected, the environment perhaps of ages acting upon them, and you have a more rapid change in the formation; you have a condition in the result which you get in the seed which is altogether different from the change in the bud; the change in the bud is simply subjected to the environment, which is a very gradual change. You may take some stock from southern soil and transplant it into northern soil, and the change of environment, change of climate, gives you the variation, but it is a very slow variation. That of course is all very plain to any one who has given any attention to the subject of biology. The question I raised was in regard to deterioration in plants which are propagated by budding. It has been stated that, with that process, the stock will run out in time and go down. Why not by changing environment improve those, and by selecting from stocks of trees that bear the best fruit? Are there not just as many possibilities, though the process be slow, of improving your stock by propagation by budding? I do not believe there is any scientific cause for deterioration of stock by propagation by budding. I do not believe anybody can bring forward any reason. Some have the idea, or express the idea, that stocks in time would run out. I do not believe there is any scientific reason for it.

Prof. Waite: Well, I tried to make the point that there was a scientific reason that it should be maintained, laying aside bud variation.

Mr. Chase: The point is, in bud variation you have the most favorable circumstances for producing invariability. In the process of propagation by seed you have always the combination of two individuals, which gives you the hereditary traits of two individuals, which gives you a change of variety at once, a more rapid change.

BUD VARIATION IN PLANTS.

BY MR. R. M. KELLOGG OF THREE RIVERS.

Variation is one of nature's immutable laws. There were never two persons or two plants exactly alike, and this principle also holds good in applied science. The artist, having painted a picture, can never paint another exactly like it. Ships built from the same drawings and specifications would behave differently in the water. A skillful engineer readily detects the substitution of an engine built from the same patterns as his own pet machine, by its behavior on the track. No two persons have exactly the same temperament or will follow the same line of action under the same conditions.

The dividing line between animal and plant life has never been definitely determined. In many of the lower orders there is great similarity. The higher animals, though born of two parents, often take a greater impress from one than from the other. A family of children born in different places, with different surroundings, seldom have a strong family resemblance, while twins closely resemble each other because they are born under the same circumstances. Mulatto children of the same family often vary widely in shades of color. There are many species of animal and varieties of plant which originally sprang from the same parents, and their differences are due entirely to changed conditions and environments.

The life principle or germ plasm of a plant is pronounced by scientists to be the same as that of the animal. There seems to be in the form of higher animals but one individual life germ. Its location in the body is still a mystery. The surgeon can not divide the body and create two new lives, which is successfully done with the plant; the latter seeming to be a colony of lives. The germ plasm of the plant has the power to divide itself, and in a mysterious way take up its abode in the cell tissues of the nodes and internodes, and yet one life seems to actuate the whole plant until these dormant germs are excited into activity, when they become a new being born of only one parent. Thus we are able to multiply plants by buds and cuttings. Such plants more closely resemble each other because they receive the impress of only one parent; yet, under widely changed conditions, great variations take place. Many of our most valuable varieties are nothing but bud variations or sports.

This society has been discussing the merits of varieties for years, and yet not one of us can today name the best apple, peach, or berry. He may be able to say which variety does best for him with his particular soil and method of culture, but when the plants are changed to other soil of different fertility and tillage, he can not tell what variations will take place. These discussions are valuable because certain sorts seem quite cosmopolitan in character, and have the faculty of adapting themselves to new conditions with but slight variation, and a knowledge of the behavior of these varieties over wide areas is very desirable because it enables the planter to reduce the chance of failure to the minimum.

Darwin, in his work on "Animals and Plants under Domestication", devotes several chapters to bud variation, and cites numerous instances of new creations and modifications of varieties under different treatment, and our own Prof. Bailey, in his books, "Plant Breeding" and "Survival of the Unlike", gives numerous instances of great changes which have come under his own observation. The rose furnishes a familiar example of this principle. By continuously propagating from branches which show a tendency to double their flowers, the florists have succeeded in producing the present magnificent specimens, which are only the result of accumulated bud variation. We have another striking illustration in the case of foliage plants. The florist finds a leaf with peculiar markings, and proceeds to make cuttings from it which vary still further, and thus he has kept on collecting these desirable variations until the gorgeous plants of our greenhouses have been brought into existence. All this has created a demand and made floriculture so profitable that flowering plants and cut flowers have become a large factor in commerce, but the fruitgrower has scarcely given this matter a thought. He seems to have had a mania for new varieties and large acreage, but the value of individual plants and their accumulated good qualities have received no attention.

In looking over the Reports of this society, the first extended reference to this subject was the article read by myself at the annual meeting of 1891, and I am glad to see that the persistent preaching I have given it among fruitgrowers is awakening widespread interest.

I began selecting and propagating from the finest plants I could find some fifteen years ago, and kept them under restriction in pollen bearing, and I am satisfied beyond doubt that it has contributed more than any other one thing to the very satisfactory crops of berries I have grown. The fruit is not only larger, but has a firmer texture, with better flavor and color, and the tendency to form fruit buds instead of runners is greatly increased. I have now provided myself with what I conceive to be an ideal soil and location, and instituted an elaborate system of irrigation to prevent plants from being unfavorably affected by protracted drouths. I have also established extensive experimental grounds, and hope in the near future to furnish more striking examples in quantity and quality of fruit through these bud variations.

Cornell university has taken up this matter, and is making a systematic inquiry to determine what peculiar soil and treatment can be brought to bear to produce desirable variations in all kinds of trees and plants. Prof. L. H. Bailey has started an orchard to be grafted from trees in different parts of the country which are famous for producing fine fruit. We shall all watch this experiment with great interest.

Among the causes which contribute to unfavorable bud variation are pollen-exhaustion and excessive seed-bearing. I have referred to this subject on former occasions, but I am persuaded that growers do not fully comprehend the necessity of guarding against these exhaustive agencies, and preserving the high potency of the vital dust. Careful observers have noted the fact that excessive bloom, both of orchards and berry fields, is followed by light crops of inferior fruit, while large crops of fine fruit always come from moderate bloom. All trees and plants have a passion for seed-bearing, and if unrestricted will exhaust themselves by this process. The fruit develops as a receptacle for the seed to grow in, and its development depends very largely on the stamina of the seeds. Orchards should be pruned in March to relieve them of surplus buds, so as to prevent the exhaustive secretions of pollen. I want to call special attention to strawberries in regard to this. They form their fruit buds in the fall and are ready to burst into bloom the first warm days of spring. Now, we take up these plants, disturbing their roots just as the exhaustive process begins, which must be prevented in newly set plants by removing fruit buds before they open. I never fail to give this important matter strict attention. Plants treated in this way will show a larger and finer development of fruit buds in the fall, and the next season the fruit will be larger and better in every way than on plants not so treated.

Lack of proper cultivation and of fertility of soil are other prominent causes of unfavorable bud variation. Planters undertake too much, and neither cultivate nor fertilize one half so much as they should. Good quality is always the result of a stimulus.

It is a common complaint among fruitgrowers that trees and plants do not fruit true to variety ordered. The trees furnish abundant evidence of having been grafted or budded, yet the fruit in no way resembles any known variety, and I ask the question, may not this be the result of bud variation arising out of almost universal practice of taking scions from young trees in the nursery rows for many years in succession, without fruiting them to learn what variations are taking place?

These trees are often grown on low ground and on soil not congenial to them, the whole aim being to secure large, smooth trees which will catch the eye of the planter and make a sale. Under these conditions it is reasonable to suppose that unfavorable bud variation will be very great. 'Tis a well-known law of nature that a faculty or power which is never exercised becomes impotent. Hence trees or plants which are propagated year after year without encouraging the tendency to develop fruit buds, lose the disposition to do so, and I believe that the tardiness of orchards in coming into bearing, and their general unfruitfulness, are largely due to bud variations, arising out of this method of propagation.

Since strawberry-growing has become so profitable, a large demand has been created for plants, and many nurserymen and plant-growers have secured low land excessively rich in nitrogen, which tends to make plants "viney," or to produce an excessive number of runners. They mat so thickly the sunlight is excluded from crowns and lower foliage. It is a well-established fact that strong fruit buds will not form in dense shade, and if these plants are propagated in this way year after year they lose their tendency to form fruit buds or develop fruit.

I regard it as of the utmost importance that plants and trees should be propagated not only from stock possessing full vigor, but on land congenial to them in such a way as to encourage the tendency to fruitage. In the strawberry propagating beds, plants should be so separated that both crowns and foliage should be fully exposed to the sunlight.

Plants may be said to be parasites. They attach themselves to the soil, send down their roots, find and appropriate their food. A graft inserted in another tree secures rootage and takes its nourishment from the stock, preserving its individuality the same as cuttings rooted in the ground. The influence of stock on graft has been a theme for much discussion, and yet the evidence adduced does not show greater variation in grafts than in cuttings rooted in the soil.

Farmers often find several kinds of potato in the same hill, and imagine the seed has been mixed. The potato has only one parent, and therefore the presence of another variety could not have any influence in effecting a change. These bud variations are the result of a stimulus, and yet may be, and generally are, of a permanent nature. When grown from seed-balls, potatoes, like any other seedling, are influenced by two parents, and the variations are more pronounced.

In recent years the sharp demand for the cheapest trees and plants has been so great that nurserymen have been forced to grow them with the least possible expense. Hitherto planters have looked only to the description of the variety as a guide in making selections. The individual plants which composed that variety all stood on an absolute equality. They assumed that one plant was just as good as another for the purpose of propagation.

In the near future the nurseryman will be required to show the history and manner of breeding his plants, just as carefully as the stock-breeder is required to show the pedigree of his breeding animals. Growers are becoming tired of furnishing land, manure, and tillage for trees and plants incapable of furnishing fine fruit. In the presence of all this evidence it is absurd to say we can not build up and maintain a higher fruiting stamina of plants and trees, and so manipulate them that they shall every year bear a large crop of luscious fruit.

For the past several years the whole trend in fruitgrowing has been to extend the acreage until growers could neither properly cultivate, fertilize, nor prune. The result is that glutted markets have confronted us, and our cry has been for better facilities, for a more general distribution, while people all around us were not consuming one half the fruit they should because the quality was so poor. Let every man consider well his resources in determining how many acres he will plant, and never put a tree nor plant in the ground without a knowledge of, and ability to meet, its requirements.

The present destructive system of crowding mongrel trees and plants upon every possible acre, without proper facilities for caring for them, must cease. I am greatly pleased to know that our Agricultural college, which is now becoming so generally appreciated by farmers, has provided a short course in horticulture, so that our busy young men and women can utilize the leisure of winter months in securing a practical and scientific training in the management of plants. When these enterprising young people have become skilled in the mysteries of plant life and in propagating, their trained eyes will detect the slight variations, and they will be persistent in accumulating knowledge of them, and under the intensive horticulture of that day Michigan will be accorded the high place to which her natural resources and advantages justly entitle her.

DISCUSSION.

Mr. Meyers: I would like to ask a question about this grafting and budding, whether you can graft any kind of bud or fruit?

Prof. Taft: If I understood the question correctly, it would be as to the trees that we would graft and plants that we would bud in propagating them. The object of the nurserymen is to bud in propagating peaches, and generally they use budding for propagating the cherry, plum, and pear. The apple has in the past been largely grafted, root grafted, as they call it. You can propagate all of our common tree fruits by budding, although, with the apple, it is generally done by grafting, and possibly the gentleman asking the question had something in mind as to how we should graft one upon the other. I will say we get the best results, as a rule, if we graft on seedlings of the same species, as, for instance, plums on plums, cherries on cherries, etc. In the case of the apple we always, as a rule, graft upon an apple seedling. In the case of the pear we graft on pear seedlings in standard trees and on quince root for dwarf trees. Regarding the peach, of course we as a rule graft upon peach seedlings. In some places, not in this section, where they have heavy, wet soils, and wish to grow the peach, they sometimes use a plum stock for that, and in the same way they will use peach stock for some kinds of plum; for instance, Lombard and some of the others do not grow as well on a peach as will some of the native plums. As a rule, I would graft them up above the crotches, nearly all of them. A large peach tree we do not as a rule either bud or graft; that can be done by cutting back and getting new growth.

Q: How is the grapevine grafted?

Prof. Taft: Well, so far as the grape goes, we would graft that, perhaps, if we had a vine that was of no value as a variety, some poor variety, perhaps; and the best way to do that is in the fall to dig down so as to expose the trunk clear to the roots, leaving just a short stub, and cutting this off possibly two or three inches above where the roots start out, and insert in that a scion, or two scions if it is a large stalk. It is very likely to split cross-grained, as we say, and the scions drop out, possibly. It is better, I think, to take a fine saw and saw it down instead of splitting, and it might do, perhaps, to make two parallel cuts close together and take out a chip between, and then cut the scion so as not to have a wedge, as we would ordinarily, and then take a little bark off from each of the sides of the lower ends of the scion; then introduce the scion, having it pressed closely in place by the force from the two sides, and you can put something over this to keep out the weather. It might be well to have some clay to put over it, but I would not use any grafting wax. Replace the soil so that the stock will be covered and possibly just a little—half of the scion, perhaps. I then put over that soil straw enough to keep it from freezing and thawing. In the spring take this away, and the scion will generally grow; but if you do not cover it there is danger of its being frozen. You can graft in the spring, but it is best to do it in the fall and then keep away the frost.

Mr. Morrill; I think Mr. Kellogg has struck an idea that is very important primarily to nurserymen, and I do not know but primarily to the fruitgrower as well, but very important to the nurseryman. In the future it will be recognized as very important to the purchaser of trees and plants.

Prof. Waite: I agree with you all about the importance of this subject, but it seems that it is rather a hard thing to get definite evidence of the matter. I have been trying to get some information for myself, for my own use, and I would like to ask Mr. Kellogg if he has any good specific illustration of the importance of seleecting buds from thrifty, bearing trees.

Mr. Kellogg: There is one matter that I did not put into this paper, but I intend to bring it out here. Some years ago I bought some Erie blackberry cuttings of Mr. Josselyn, of New York, a man of reputation, and I received a lot of them, and propagated the plants, relying on his judgment. I had a good deal of correspondence with him before about it, and he said he purchased them of the producers that fruited them, and that he knew they were genuine plants beyond all question. He had propagated and fruited them himself, and they were just as fine as could be, and he knew they were not mixed. Now, I bought these cuttings, and I sold them to my sorrow, for of all the mongrel masses I ever saw those cuttings were the worst. There were not only two or three varieties, but two or three hundred of them. Those cuttings had been taken right off of the roots every year without fruiting them, right straight along. I went down to Ohio to see some that I had sold. No nurseryman on earth would have sold such plants if he knew what they were and had a spark of regard for his reputation—never in the world would he have sold such plants. There were all kinds of berries on them, all kinds of things. Those on my own ground started up in the same way. I saw one patch of 500 plants that was so thick with suckers that a cat could hardly crawl through them. What is the object of cultivation, the whole system of cultivation? It is to make plants better, to make them bear better crops. It is not and has not been carried on as scientifically, perhaps, as it ought to be; but I am satisfied that there are slight variations. You take a potato, for instance, to furnish a good illustration. You plant a whole large potato and there are only a few buds that will start from it. Sometimes you will only get one bud and the others will lie there dormant. You dig down very quietly and take off an eye of that and plant it by itself and it will at once start in. Some of our scientific friends who are with us today may be able to throw a little light on the subject of these variations. It is a new thing. I never heard the subject discussed until recently; but now it has been taken up, and I hope through that to get more definite varieties. Florists have been trying to get something more beautiful, and they become experts. With fruitgrowers as a rule there has been no opportunity to look up this matter, because these slight variations can only be understood by an expert. It is just as it is with a horse—one man can know and see a valuable point in a horse, but I could not detect it. The man who is an expert, has made it a study year after year, can get better results. I understand that around Fredonia, N. Y., they have low land, clay ground, a soil which is not congenial to blackberries, and I am satisfied that that uncongenial soil has produced great variations. They say there are never two blackberries nor two strawberries exactly alike. What we are trying to get at is, what shall we do to make plants produce certain ways? You can not do it any more than you can in breeding animals. As plants grow, the germ plasm changes. It is so in a man. As the body grows old the life seems to grow morbid, or at least become inactive, and this may result from many causes. The only thing we can do is to discard the bad variety and get one that grows better. It is true that nine tenths of our really desirable plants are discovered by accident. Mr. Mason has discovered a berry growing in the woods. He does not know where it came from. It probably had been a seedling, because of its wide variation, and he thinks he has something that is really worth offering to the public, and he proposes to try it in different localities. I think that is a good thing. In certain soils plants vary toward a betterment, and in other soils they go in the other direction. I can see that the evidences of wide variation are not great, yet it is true that a sweet apple has been found on a sour-apple tree. I believe those things have occurred, that they have been propagated. Prof. Bailey says they have, and Darwin says they have, in certain trees and limbs. As an evidence that these things do occur, florists are very careful when they find a limb that is peculiarly marked. I would like to have Prof. Taft explain what variations he has had. I have had no experience in the greenhouse business. I never propagated a rose in my life. I took that from the statement of others and what I find from reading. Prof. Bailey refers to that.

Prof. Taft: I have had no great experience in the matter of these sports from bud variation, but I have seen a few cases, and if any florists are here I am sure they have noticed the bud variations that often occur in the chrysanthemums they have. It has not been uncommon for a white variety to form on one branch of a yellow sort, and they are always careful to take off all but one of those, and then they have "16 to 1." In the case of the rose there are a number of instances where, by means of bud variation, they have obtained new varieties. For instance, take two of the most commonly grown of the new sorts, a dark pink kind and a white variety. They both came as bud variations from a light pink kind. The old Catherine Mermet is a light pink variety, and from that a sport that is a bud variation gave a white rose; and now we have Bridesmaid, a dark pink, which is also a sport. So you can see it is not uncommon, and in the case of many other fruits, many plants, we have these variations in the color and in the nature of the fruit.

Prof. Tracy: In breeding tomatoes we pay great attention to setting each individual plant. We have observed for several years that the rough fruit on a tomato vine was nearly all on one branch; that is, if we had five rough tomatoes and forty smooth ones as the product of a vine, we would find four of those five tomatoes were the product of one branch. This led us to the question of whether, by saving the seed from that branch which had rough fruit we would increase the tendency to rough fruit in the product. So this year we saved seed from three different plants, one of the branches of each of which produced rough fruit, and the remaining two or three or four branches produced smooth fruit. We saved several of the seeds from the rough branch and smooth branches, and planted them. We had about twenty-five plants in our trial in each case. The result in the three varieties in which that test was carried on was that we thought we saw some difference in favor of the product of the smooth fruits, of the seed from the smooth fruits of the plants in each case. We were not sure of it. We did it by counting, by ascertaining the number of fruits which were smooth and the number which were a little rough, making a difference in favor of the plants from the smooth fruits. But we put in two test cases in which we had two samples of twenty-five from rough fruit and two samples of twenty-five from smooth fruit, and we found as much difference between those cases where they were from the same branches as we did from the others. So it did not prove anything. In other words, our experiment has not demonstrated anything, although its tendency is to show that there is a difference in favor of the seed saved from the fruits of the smooth branches. I wish to say another thing, speaking of environment and variety: Blanche Ferry, as perhaps you know, is a pink and white sweet pea. That variety was at one time picked out and propagated and sent out as American Belle. It is not true, it is simply a condition of Blanche Ferry under certain conditions, and the Blanche Ferry nearly always shows that condition the last of the season when there is an abnormal growth. The Blanche Ferrys which we had on our ground of the early and the ordinary type, all showed these American Belle wings; that is, the flowers, instead of being nearly white as they should be, were pink with white dashes. It was some of the same seed exactly, out of the same package, and the same sort. In England has been produced a variety similar to Blanche Ferry, but which the producer traces to a different parentage. He claims it is simply an enlargement of Blanche Ferry and of better substance, as he terms it. Now, theoretically, that has no trace of the blood of Blanche Ferry, yet Little Pet on our ground this year showed the same habit that Blanche Ferry did; that is, instead of having very white and pink wings it showed the stripe of American Belle. Now, it seems to me that this instance, so far as one single instance can go, goes a very long way to point out how the variation, apparently in inherent character, can be affected by the environment of any variety in a single season, and how parallel those conditions of things are. They are to me a very curious illustration. It might be asked whether we desire to use that seed another year. We do not care to use it, we do not use it; and yet we know that we have selected American Belle just as carefully as we knew how, and the next season we had the most beautiful Blanche Ferry out of that American Belle seed. Still, we do not use that seed. I wish to bring out another question. Seedsmen keep a very careful record of their crops, and of the quality of their crops. In regard to the garden pea, our practice is to get a plant that will ripen its whole crop at once; we pay a great deal of attention to that. It is a fact that from the same stock the products of different years are very different in their fixity to a given time. For instance, there never has been a crop of extra-early peas that was equal to the crop of 1882. Only last year I knew of a seedsman who paid a great deal of money to get some 1882 extra-early seed, because the product of that crop produced in 1882 adhered more strictly to the peculiar type than any other. I mention these as interesting points which have some influence on the question.

Mr. Kellogg: I began in this kind of work by selecting the plants having the best general characteristics; that is, selecting for any definite object in view. When the Haverland strawberry came to me I was greatly pleased with it as a whole, but I did not like the shape of the berries, and I make that a factor in selecting berries every year, selecting the plants from which I take cuttings. Now these Haverland strawberries are better than they used to be, and I am very greatly pleased that we have this berry; but I have made comparisons with plants that are grown without regard to that one thing in other places, and the whole thing may have met with some change. Here, you see, a person is likely to be deceived, and, as stated in the paper, I am going to begin a new series of experiments, and I shall watch this inquiry of Cornell with a good deal of solicitude to see what their results are. I am sorry I have not the questions here. I do not know what they have discovered, or what particular influence excited them to send out these inquiries, but I am satisfied that the general vigor of plants can be maintained by discarding those which are weak from any cause, whether it is a root weakness or any other weakness. Sometimes a plant will have no rootage. There is no question but plants do vary in their fruiting ability, and that they run out. Such running out is simply a varying in the wrong direction, taking on qualities we do not want.

Mr. Hetzman: Mr. Kellogg tells us that he thinks varieties of fruits, propagated as they usually are in the nurseries, are likely to deteriorate or vary. He tells us that he keeps the blossoms all off of the strawberry plants that he grows for production of plants. Now, would not the same cause work the same effect to the strawberries, not allowing them to fruit, taking plants from those that had been kept restricted, would it not work in the same way?

Mr. Kellogg: Identically the same way, but that is what Kellogg does not do. I am glad you brought this up. I used to remove all but one or two berries until I found the plant well established. It is like a gymnast. When prize-fighters get ready for a contest they go through a course of training for weeks and weeks, which it would kill me to undertake. The gymnast develops his muscles, and the berry is not an exception to that rule. The second year I take scissors and cut out all the weak blossoms, and simply let the plant develop a few seeds to great perfection. Perhaps it is crankiness in me, but it is just like learning to write; you follow an improper method and you will never make any improvement in the world. The second year, when I get what I call a stocky plant, I cut off two thirds of it, and I do not let it go to pollen exhaustion. That is one of the most important things in the whole system of breeding plants. My experience has satisfied me beyond a question that if you cut those off every year and allow the plant to do all it can without pollen exhaustion, it gains strength. I wish to keep things in a normal condition and keep them going right along; that is the idea. I would not cut blossoms off from strawberry plants every year, neither would I cut off the plants. I never allow spring-set plants to raise a berry.

Mr. Smith: I would like to ask how many times one must reproduce a new variety before he has a legitimate right to give it a new name?

Mr. Kellogg: I suppose there is no restriction on giving anything a new name. It is a matter of honor, of taking an old variety and giving it a new name and putting it before the public as something new.

Mr. Reid: How long should a man test a variety before sending it out; how many seasons should he develop and test it?

Mr. Kellogg: It is a question of reputation on the part of the producer. It has been found, by men who are giving that subject attention, that it is not safe to put out a variety, because some kinds will do well in a particular soil and make a great record, but when transferred to other soils people say they are not good for anything. There is no question but Mr. Loudon, in producing the Jessie strawberry, made a record, and men of reputation beyond all question testified to the excellent crops he produced of Jessie. I have been in correspondence with people who say Jessie is one of the best berries that ever grew; and yet, where I have one letter giving such testimony I could get a hundred that it is absolutely worthless. That does not reflect on Mr. Loudon; but if that variety had been tested by these fruitgrowers and evidence taken from such tests, it would never have been introduced. It is going out of cultivation today; it is not safe to recommend it; it has peculiar weaknesses; it is a local berry, it does well in some places.

Mr. Morrill: I saw Jessie on Mr. Loudon's place, and you could pick quarts right along running but twelve to fourteen berries each. I never saw anything like it.

A Member: The practical strawberry-grower who wishes to grow his own plants, what would be the best course to pursue if you take the blossoms all off of the spring-set plants?

Mr. Kellogg: The trouble with the growers is that they usually do not take off the blossoms at all. I am satisfied that continual propagating from plants indiscriminately in that way causes some of them to become exhausted. You plant right along here in a row, all receiving the same cultivation, comparatively, with no insect injury; for six or eight feet the berries are nice on all of the plants, and a little further on you find hardly any berries. Why should these plants, two feet apart, comparatively on the same soil, differ so greatly? You find one plant came from some plant that had either not recovered from a former weakness or was simply in better condition. My experience is that you can spend your time profitably keeping posted. When you see a plant that is giving you many berries, it shows it has good blood. The next year your plant will give you good fruit if you do not let it exhaust itself and become a worthless plant by over-breeding—that is what it is, simply over-breeding, and all the laws that obtain in animals obtain in just the same way. You should keep your plants in proper shape. It is the most profitable thing you can do. I would propagate my own trees if I were going to set an apple orchard. The whole system of nursery business has been prostituted to the man who can produce trees for the lowest price. I have catalogues that offer me trees for three cents apiece. When you expect to get something for nothing you are always cheated, and trees are not an exception to the rule. When fruitgrowers are willing to pay nurserymen a fair price for producing a good thing, they will get it; but the tree-peddler going through the country can offer trees that will do wonderful things, and he has no backing. He is doing all this mischief. I do not mean to say anything too harsh against tree-peddlers. They are one of the means for distribution of nursery stock. But go to some local man whom you know, who has a reputation at stake, and you will do better.

Q: What does it cost to raise a good tree and put it on the market?

Mr. Kellogg: You can not do it for three cents; you can not do it for ten cents, either.

Mr. Morrill: Yes, you can.

Mr. Kellogg: Well, possibly you can, doing it in a wholesale way. These quotations were on peaches and apples.

Mr. Mason: I have a few trees on a small scale, to illustrate the idea to the gentlemen, to give some idea of what it would cost a man to raise a tree. It would depend on the luck he has, one year with another. A year ago last August I had about 30,000 peach trees, and they were in as fine shape as a man could wish. Last fall I had lost 2,700. What was the cost of raising those trees? It has been just so several years. If I had had good luck and raised all those trees, every one of them, I might have produced them for three cents, the actual cost of the tree. Mr. Morrill says he would rather raise wheat on the ground than to sell trees for three cents apiece. Mr. Kellogg speaks of tree-peddlers. I am one myself, I admit. I go through the country taking orders for trees, but we have men who will sell trees for any price they can get. A man can not produce good trees for three cents per tree.

Mr. Graham: I have been very much interested in this question of bud variation. I have myself noticed a great many times a variation in the same varieties of fruit. For instance, the sweet apple, or nearly sweet apple, which should be sour; or, very frequently, the Barnard which is known as a freestone peach will be absolutely a clingstone. Lewis sometimes will cling somewhat, although ordinarily it is a freestone peach; Hale's Early, which is not exactly a freestone, sometimes is an absolute clingstone; other seasons it will be absolutely free. The Niagara grape is peculiarly subject to this variation. One vine will be a good producer of fine fruit, another produces very inferior fruit. But I have remarked on more than one occasion that the higher-price trees I have bought have been more subject to bud variation. For instance, a few years ago I bought some peaches, I believe they called them Diamond, but I am not sure. I think I paid a dollar apiece for those trees, and they were remarkable for bud variation! I bought some others they called Early Canada, for which I paid fifty cents apiece. They were Serrated York. It was simply a case of extreme bud variation! Three years ago I bought 200 Crane's Early of a nurseryman. I think I paid him ten cents apiece for them. Last year, that is, the past season, they bore quite a lot of fruit, and I had Alexander, Crane's Early, Lewis, Hale's Early, and Early Rivers—another extreme case of bud variation! I have noticed very frequently, too, that this bud variation has a wonderful tendency to occur and recur in the nurseries of certain people. It is peculiarly adapted to certain sections of the country, while others are almost entirely free from it. There are other nurserymen in this state of whom I have bought year after year large bills of trees, and there has never been a single instance of bud variation in their trees. Now, it is something that I do not understand, exactly; it is something quite peculiar, why it should occur in one nursery almost universally and in another not at all, but is more likely to occur in the high-price trees—these dollar trees that we get of people who come along.

Mr. Slayton: Is it not possible that this term "bud variation" is one invented by nurserymen to act like charity, to cover a multitude of sins?

But there is such a thing as bud variation. Let us call it sports. We all know that similar phenomena occur among animals, and why not among plants of all kinds and fruits of all kinds? It certainly does. I have seen a white weasel, and I have seen a white red squirrel, pure white, but a red squirrel nevertheless. We have all, perhaps, seen white blackbirds and white robins. I have standing in my museum a white buck two years old, a white deer, the parents of which were undoubtedly common red deer of Michigan. About two years ago I picked from a Baldwin apple tree a cluster of three apples, all growing from the same fruit spur. Two of them were Baldwins, and one of them was a perfect Golden Russet in color, shape, and texture; and in slimness and length of stem, as compared with the Baldwin, and I did intend to find out whether the quality was such, but I laid the three aside to take to the horticultural meeting and ere I knew it I forgot them and they decayed, so I did not have a chance to test the quality; but if I ever saw an apple that was a Golden Russet, that was one on that stem. I will state that the next tree south of the Baldwin tree was Golden Russet. That was simply a sport.

Mr. Morrill: There might have been cross-pollenization there.

Mr. Kellogg: If he had taken this shoot and propagated it, and the same thing had continued, then there would be evidence that that was a true bud variation; but he only had the one tree, and it may have been in blossom alone; it may have been affected by an insect, or something might have hurt the germ or changed it in some way. A man never should think of starting a fruit orchard until he has gone down and taken that short course in horticulture and learned the art of propagation in a scientific and correct way; that is what the winter term is for; it is not to bring up a lot of nurserymen, but it is to enable a lot of practical men on the farm to learn these things. I have no doubt but the bud variation of which Mr. Graham speaks, was the result of carelessness. A man may have one tree in a peach row, and he in making his bud cuttings cuts a lot of buds from that, and then goes on. And look at it—all scattered over, a lot of mixed trees. Some nurserymen every year or two, to prevent just such a thing as that of which Mr. Graham complains, renew the stock, but they do not like to bud continually from bearing trees on account of getting friut-buds instead of leaf-buds.

Mr. Morrill: Prof. Waite asked a question as to whether there was any positive evidence in this line. I would like to hear from you on this point. Is there any, have you ever seen any test?

Prof. Waite: No, I have not. I have not seen any test myself. There is some evidence, but there are a good many cases cited that have not such absolute certainty back of them as to make the proof positive.

Mr. Kellogg: It is claimed that the nectarine is a sport of the peach. Have you any evidence of that?

Prof. Waite: All I know is that that is what the books say, that is the literature on the subject. I never made a nectarine out of a peach, nor have I seen the thing done.

Mr. Morrill: You know you can even find almost an ideal nectarine on the Alexander peach tree. Our fruitgrowers understand that. You can frequently find almost an ideal nectarine on an Alexander tree.

Mr. Kellogg: The question is, can you perpetuate that almost nectarine?

Prof. Waite: When I asked that question, I was in earnest; I wanted to know if you really knew any cases. I am rather inclined on general principles to believe that there must be something in bud variation, but so far as my own experience goes I have nothing definite. I say it is a matter of general principle rather than of specific illustration.

Mr. Morrill: In your department at Washington, would that not naturally come under your observation?

Prof. Waite: Well, I spend a great deal of time in the orchards, you know, and out among the trees.

Mr. Morrill: Your specialty is studying diseases?

Prof. Waite: Yes. Well, we have to study health and disease as well. We study both the physiology and the pathology. It is one great question-mark in my mind whether we know positively of cases of bud variation. Those cases in which the theory is best proved are in case of variegated plants. There are variegated sports, variegated branches, which of course originated from buds on certain plants that have appeared on a normal green specimen and have been capable of propagation. Bud variation means a permanent variation, not a mere variation according to the conditions of the year. Bud variation, as ordinarily used, means a permanent, inherent difference in the individual branch or the buds upon it, but even in case of the bud variation of variegated plants, that alone would not settle the question definitely, because we have not yet fully mastered the subject of variegated plants. We do not know precisely the nature of those variegated leaves, and it is not altogether certain but they represent a case of disease. There are several things which can produce a rusty surface to apples the outside skin of which is normally smooth. Frost, when the apple is very young, is supposed to do it, but one thing that often produces it is the action of a small mite, an exceedingly minute insect, that produces rust. I had a rusty pear sent to me last week, with the explanation that it grew on the side of a tree next to a russet apple tree. I think it was simply a case of this mite. There are sometimes whole trees covered with such rusty pears, caused by the mite. I simply mention this to show you how these outside things cause people to be misled; and the possibility of these things that sometimes we can explain and sometimes we can not, is all the time throwing cold water on the bud variation theory. Now, I have been propagating a few apples, pears, and peaches lately; and the question came to me directly, what shall I do in my own case for trees that I want to grow myself? Well, I answered it for myself in this way: I am going to get my buds and my scions from the very best trees that I can find, from which I can get horticulturists to send me scions. I wrote to my horticultural friends, and got them in that way so far as possible, from the very best trees, for this reason: that if there is any possibility of inherent variation in these scions, I wanted to be on the safe side, and I think probably that is about the best a practical man can do at present, if there is anything in bud variation, to be sure he is on the safe side and get his scions and buds from the very best bearing trees. If there is anything in it, I believe it will be in this way, that it will be those minor differences, in regard to smoothness perhaps of the fruit, slight differences in the shape of the fruit. As was said in the paper, no two specimens of Baldwin apple, Bartlett pear, or Giffard pear are exactly alike, but the differences are only slight ones of that sort, differences in fruitfulness, etc. There is no question but there is a great deal of variation in the plants as we find them, but the difficulty of cornering that down to bud variation is so great that I have not any specific illustration to give you upon it.

Mr. Kellogg: This is mentioned very largely in Darwin's "Plants, Animals, and Trees under Domestication." Prof. Bailey has mentioned it. I think this whole thing shows lack of observation. I know that you only get the impress of one parent; but since no two are ever alike, I do not see why you can not vary them, and yet, when you ask for definite proof, a distinct illustration of the point, something in which the variation is so very great, why, we simply do not have it. It does not occur all at once. The small variations we must learn to detect.

Prof. Tracy: I just want to remark that in 1896 and 1897, each year, we examined 200 tomato plants. We first picked out the rough fruit, the unsalable fruit; then we picked all the fruits from the plants, putting those what came from each branch by themselves, and then made an estimate, figured the percentages to determine if a majority of the rough fruits came from rough branches. It was, if I remember rightly, in 1896 that we had this fruit planted. It was 87 per cent. rough, and I think three fourths or over came from one branch. This year it was over 90 per cent. in the two hundred plants we examined. I think the only way to get at those things is to have a number of individuals making observations. We have saved this year the seed of the rough fruit and the seed of the smooth fruit so as to intensify the thing, if we can. You get a great deal of variation of these seeds because they have two parents and the true variation is the bud of an individual.

Prof. Waite: The right place to study bud variation is on plants produced asexually, but the difficulty even there is to separate the variation due to environment, nutrition and other causes from inherent variation, which we mean by bud variation.

Prof. Waite: Because a plant was in a high state of nutrition and was in good condition to propagate from, might not prove bud variation.

Mr. Kellogg: But it would prove this, that it pays to give high culture and take those that are in the best environment and best condition to meet your future requirements.

Prof. Waite: The point I wish to raise is just this: It is an open discussion between seed-breeders, which of these two cases will give you the most desirable seed: You have one field in which you have a local condition which tends to throw out and develop all the tendency toward sport which is dormant in the variety, particularly in the case of peas; you have another field where the conditions are favorable to grow that pea to just the type you desire. In the case of the first field, you can go through and pull out all the plants which show the off tendency; in the second place, the plants which may show the off tendency are left, because conditions do not favor the development of the tendency. Now, which of those two lots of seed is the most desirable for breeding-stock? I have found my own experience immeasurably in favor of the second class, that is, a lot of seed grown on favorable soil and from which we have not pulled out so many sports, and where all the plants develop properly. That class will be more true in its reproduction than the same seed grown on unfavorable soil, and which has tended to develop all the sports and from which all the sports are supposed to have been thrown out. That is in favor of the position that the influence of environment would tend to give better results.

CO-OPERATIVE FRUIT PACKING.

BY MR. EDWARD HAWLEY OF FENNVILLE.

The profits of fruitgrowing depend largely upon the manner in which the fruit is placed on the market, and carelessness or dishonesty in packing, lack of uniformity in the size of packages used, rough handling, or dilatory delivery by transportation companies, will cause loss in handling a crop that otherwise would prove profitable.

The evils of our past system, or rather want of system, have been of a nature that could not be overcome by individual action, and those of us who have long realized that our methods of marketing peaches were unbusinesslike and ruinous have felt powerless to inaugurate a radical improvement.

We all know the history of the Michigan peach basket, beginning as it did with the honest old third-bushel round basket, and how the ingenuity of the manufacturer produced a basket exactly similar to all appearance, but which he assured us would not hold quite so much fruit as the basket the other fellow was selling, and that no one would notice the difference when placed upon the market. The other fellow, however, soon "caught on," and a yet smaller basket was the result, until we have now nearly arrived at the vanishing point as to size of packages.

Another weak point, and one that has done the most to bring the Michigan peach into discredit, is the disgraceful manner in which much of the fruit has been packed. Various grades of peaches have been found in the same packages, the poorer grade at the bottom but not to be distinguished (in appearance at least) when placed by the side of the well-packed basket of the conscientious grower. Can we wonder that Michigan peaches are at a discount in the large markets, or that low prices for Michigan fruit continuously rule?

The painstaking and the careless, the honest and dishonest, the "snide" package and that of full measure, all suffer alike from this state of affairs. Peaches in packages of all sizes and shapes, packed well or badly, are dumped upon the market in a mass, sold by the commission man in lots as they run, and the sales "averaged," and about the same prices returned to each grower, irrespective of the intrinsic value of his fruit.

The system of coöperative packing will, it is expected, change all this. One of the axioms of business today is, "In union there is strength." As an individual peach-grower I can not establish a brand for my fruit that will become known, but a number of us with a large volume of fruit can do this. The packing-house does away with home-packed fruit, so far as the members of the company are concerned. We have a large warehouse situated close to a railroad side-track, fitted with improved conveniences for grading, sorting, and packing the peaches in as uniform and tasteful a manner as is possible. We have no difficulty in procuring the best trained help to do the work, for we can offer steady employment throughout the season, which the individual grower can not always do, while the various expenses are reduced to a minimum. Transportation companies, when dealing with large shippers, are also found to be more pliable and willing to afford facilities that are grudgingly given to individuals of less pretensions.

Grades, as denoting size of fruit, when once established should not be changed. Our Fennville packing-house has been using four grade or size-marks, viz.: x, xx, xxx, and "Fancy." These brands signify size only, and range from the smallest size that is considered marketable to largest or fancy size. Qualities other than size are specified by stamping on the package the number of pounds' capacity, color of peach ("yellow" or "white"), "ripe" or "hard," "high colored," "smooth," etc., the object being to so describe the contents of the package that there can be no misunderstanding on the part of the buyer as to what he is getting when he buys a basket of our fruit.

With only one season's trial, we can not be said as yet to have passed the experimental stage of the business. Time will be required to perfect and develop. It is suggested that eventually a federation embracing all the packing-houses will be consummated, with a board of control having general supervision of the whole system of the state, whose duties shall include the proper distribution of fruit, regulating the grading to insure uniformity throughout the state, and to use the united weight of the organization in dealing with the railroads.

It would seem that all fruitgrowers should be willing to help along a movement of this kind, realizing as they all do that improved methods of packing and marketing our peaches is becoming an absolute necessity, and that coöperative packing can be developed into a power that will place Michigan, as a producer of choice fruits, in the foremost rank, and Michigan fruitgrowers shall become known throughout the country as an honorable and businesslike class of people.

BY MR. C. F. HALE OF SHELBY.

Coöperation and organization among fruitgrowers and farmers is a theme that has long been argued and discussed, and I might say tried in various ways, until it has become a general saying with all classes that you can not formulate any organization or coöperative plan or system to hold farmers together. I am not going to say how much truth there is in this, but I do say that the idea and plan are not only feasible but practicable if rightly carried out. As the old saying is, in union there is strength, and all know that this is true, as we have seen it demonstrated many times. It is not my intention to take up much of your valuable time with theories, but to give you some of our own experiences and what led to our present plan of work.

In the spring of 1896 we organized a fruitgrowers' and shippers' association, consisting of growers only at first, for the purpose of obtaining better rates and facilities for shipping our fruit, which we accomplished beyond our anticipation; as we found, when we went before the transportation company and told them we represented so much business, we were very cordially received, and concessions asked were nearly always granted. This accomplished, we sought to obtain better prices for our product by grading and packing it honestly and warranting it to be as represented. Right here was where we failed, and first saw the need of a central packing-house. We found that the fruit, while it might be honestly packed, lacked uniformity, as every man had a different idea as to what the grade should be; or the man who had not taken pains to grow nice, large, fancy fruit, and not seeing his neighbor's, naturally thought his was as good as any one's and marked it the best. He had No. 1, while his neighbor's No. 2 was really better than his No. 1, and as it all went into the same consignment, or was sold to the same man, he naturally thought of receiving pay for it on the same basis. Both were marked No. 1, and as he did not understand the condition or facts of the case, the consignee thought there was fraud somewhere, hence sold it the best he could and made out his account of sales of the whole lot together for a little more than enough to cover the freight and commission, claiming that fruit was dishonestly put up. So the man who had the fine fruit had to suffer loss and pay the freight on the poorer fruit. It was too late, amid the rush and enormous crop on hand, to rectify our mistakes then, but we struggled on to the close of the season, very much discouraged with the outcome, as a whole; yet I could see, with the close connection I had with the business, that it had not been an entire failure, as it had opened to my view a better plan that I was sure would prove a success. That plan was the central packing-house system, where all fruit should be brought to the house ungraded and unpacked, to be uniformly graded and packed under our general management. So, with this end in view, we went to work to reorganize and to incorporate under the state law. This we accomplished, then set to work to erect a suitable building for the work, which we have finished. We operated under the improved plan the past season, with very satisfactory results. While some of the matter of detail may not have been perfect, yet the plan and system is. We make three grades, which we warrant to be as represented throughout the basket. This refers to size more particularly. Grades once established are never changed, so when buyer gets one lot he can order again and be sure of receiving the grade bearing the same mark, and it has been the means, as was expected, of bringing the buyers right to our door. It has established a home market for most of our fruit, as buyers can see just what they are getting, and after satisfying themselves that we mean business they can go home and order by wire just what they want, as they have done the past season. After the fruit of any member has been graded and packed, and he given credit for what he had, it loses its identity and becomes the company's property and is so disposed of.

Although we have had only one season's experience, yet we are all satisfied, and have no desire of returning to the old way. It makes less work and worry at home, and can be done at less expense. We are all of the opinion that if we had operated upon this plan in '96 we would have made some money out of our peaches that year, as good fruit always sells at a fair price, and every one would have gotten pay for just what he had. We are of opinion that if the system were adopted in more of the fruitgrowing sections it would be a long step in the right direction to overcome the reputation we have as a state of putting on the market so much trash, and we can heartily recommend the central packing-house system.

DISCUSSION.

Mr. Slayton: How is the expense of the packing-house borne—according to the number of bushels, or according to the number of dollars that each contributor receives?

Mr. Hale: According to the number of bushels each puts in.

Mr. Slayton: A thousand bushels of No. 3 would cost a man just the same as No. 1.

Mr. Hale: Yes, sir, it would require just as much work to pack them.

Mr. Morrill: Will you give us the plan of keeping account with your patrons? I have reference to how you get your pay for the work.

Mr. Hale: In the first place, this was a question that we were somewhat divided upon, whether it could be done, whether the fruit could be kept separate with no mistakes and each man given credit for what he had. At first we made an estimate as to how much the expense of this would be, including baskets and all expenses pertaining to the packing and loading of this fruit and shipping it, book-keeping and all. We finally came to a basis at an estimated percentage per bushel, and decided that if at the end of the season there should be anything left it would be pro-rated back to the growers according to the number of bushels they had.

Mr. Morrill: Have you any objection to stating what the price was?

Mr. Hale: I have not. When we proposed to erect the building, the question was, how could we build it. How could we raise the money and go ahead? We finally adopted a plan whereby we made a stock company. We took so many shares, determined according to the number of bushels or according to the number of acres of orchard we had, as nearly as we could get it, so it would be equally divided; and then we paid part in, and for the balance we took out so much per bushel value on fruit sent through the packing-house by the members. This expense or what we took out applied on the packing-house, and on this stock, and the estimated expense for everything was twenty-four cents per bushel, which we deducted from every bushel before the money went into the hands of the growers. That was all deducted, twenty-four cents on every bushel. That paid for all the baskets and all the expenses connected with it. We found at our settlement that this paid for everything. Our expenses were heavier this year than they would be again, because we had books and office fixtures to buy. We have on hand books enough to run us a year or two, and the office fixtures will last several years. We found that we had enough to pro-rate back to the members to make the actual cost of the handling of the fruit, outside of what we applied on the packing-house, about 18½ cents per bushel. That covered the cost of baskets and everything.

Mr. Morrill: The fruit delivered?

Mr. Hale: The fruit delivered on board of the cars.

Mr. Morrill: That includes receiving, handling, packing, and putting in the car and selling?

Mr. Hale: Yes, sir; the whole thing, except, of course, freight.

Mr. Morrill: Delivered on board cars. I believe the car stands right alongside your packing-house?

Mr. Hale: Yes. Our building is 160 feet long, 40 feet wide, 2 stories high, basement under the whole.

Mr. Morrill: Is your fruit sold or consigned?

Mr. Hale: I would say that we sold over half of the fruit right there, and might have sold the other half had we had it in large enough quantities to run a car out just as it was wanted. The buyers were not willing to take what we had unless we had enough to fill a car.

Mr. Morrill: You sorted each man's fruit separately, of course, so as to know how much of each grade he had?

Mr. Hale: Yes, sir.

Mr. Morrill: And then mixed the lots, and paid accordingly?

Mr. Hale: Yes. Our plan of doing that was, when a man brought his fruit we gave him a receipt for his ungraded fruit. It was placed on a bench by itself, graded, packed, and labeled, and before this was disturbed or removed it was taken account of and he given credit for what we graded out in different grades, so when we got the returns we knew just how much he had that day of that fruit. We made up an average price that day—every man received alike for fruit disposed of each day. For instance, we sell a man fifty bushels or a hundred bushels. We take the general average and every man received the average for that day.

Mr. Morrill: How about your grades? You say you graded them in certain grades, the grades to remain the same.

Mr. Hale: Yes, sir.

Mr. Morrill: One, two, three, and four, for instance. Now, how about your varieties—for instance, your No. 1 of Elberta would be very large, while your No. 1 of Barnard would not average in size with your No. 4, probably, of Elberta, so far as size itself was concerned. How do you reconcile the difference in size?

Mr. Hale: So far as that is concerned, just the instance you have mentioned, we did not have any Elbertas graded that way, nor any of the other large-growing varieties to speak of, this year; but in shipping, if they were Barnards we marked them Barnards. There would not be any really fancy sizes of Barnard.

Mr. Morrill: Do you keep the size No. 1 practically the same?

Mr. Hale: Yes, sir.

Mr. Morrill: And all above No. 1 of those very fine varieties would go as fancy, and stand on their own merits—is that the idea?

Mr. Hale: Yes, sir.

Mr. Morrill: In that case, then, our very large varieties would go in as fancy? Mr. Hale: Yes, sir.

Mr. Morrill: All the specimens of a large variety would go as fancy, practically? Mr. Hale: Yes, sir.

Mr. Reid: Your people were satisfied with the results this season?

Mr. Hale: They were, yes, sir, well satisfied.

Mr. Morrill: Did you receive fruit from any but your stockholders?

Mr. Hale: We did some, not very much.

Mr. Morrill: It was not your intention to do so?

Mr. Hale: It was not our intention to do so, no, sir. We might have done more of that, but outside of our company the orchards there were bought up quite early in the season.

Mr. Morrill: Did you handle plums in that manner?

Mr. Hale: Yes, and apples. We do not grade potatoes, and yet we could handle them in the same manner.

Mr. Morrill: You have not had time, then, to establish much of a line of business of your own sales, persons to whom to ship?

Mr. Hale: We have done that in a small way. The year before, when we organized first, we made arrangements for certain houses to handle our fruit.

Mr. Morrill: You mean by that, commission houses?

Mr. Hale: Commission houses, and what we have consigned we consigned to those same houses, but we sold on orders in different places and did not have any go back on us.

Mr. Morrill: Have you solicited those orders, I mean tried to establish a trade? Mr. Hale: Yes, sir.

Mr. Morrill: And successfully, so far as you went?

Mr. Hale: Well, I think I shipped the last two carloads to LaCrosse, Wisconsin, and the buyer was very well satisfied, and wrote me a very flattering letter as to how the fruit was received, that it was just as represented, and his customers took to it.

Mr. Morrill: There was some amount of poor peaches?

Mr. Hale: Yes. As fruit commanded a better price this year, we put the low grade upon the market for what it would bring.

Mr. Morrill: In bushel baskets?

Mr. Hale: Yes, in bushel baskets, for whatever it would bring.

Mr. Morrill: You got something out of it?

Mr. Hale: Got something out of it, after paying our expenses.

Q: Would not an evaporator work in there all right?

Mr. Hale: It might. I am not sure about that.

Q: Suppose one grower has peaches without color and another has the same grade that are very nicely colored. Would that come in and play any part in grading?

Mr. Hale: I think that Mr. Hawley's paper has covered that point. We have a certain market in which we can sell them, whether ripe or green, yellow or white. We did this year.

Mr. Graham: I wish to say this in connection with this system of coöperative packing, that fruit exchanges have become the popular thing in the fruitgrowing sections all over the United States. Probably you will all remember the American Fruitgrowers' association that was organized a year or two years ago, in Chicago. It is still in existence. While Michigan kept out of that association, I went over as a delegate, but refrained from going into the association with our local society. That is an association of associations. They propose to take charge of and handle, under a general manager, all the fruit that is grown in the United States. They do not deal with individuals directly, but with the associations entirely. They claim they are making a great success of it, but I know nothing about it personally. I met there at that meeting, among others, a Mr. Fay of New York, who had had charge of the Chautauqua Grape-growers' association for years; and while in Michigan they look upon the Chautauqua Grape-growers' association as being one of the great successes in handling fruits, he said they had a vast deal of difficulty. At first it was all right, the first year or two it worked very smoothly, but very soon came a great deal of jealousy.

This one or that one did not get what he supposed he should have, etc. They have operated practically upon the same plan. The fruit was brought in and graded in a central packing-house, and sold and handled by the agent regardless of the wishes of the owners of the fruit. He has absolute control of it under their rules. He says there soon grew up jealousies and differences between the contributors which caused them a very great deal of trouble, and in the end he considered it practically a failure, while they had had some temporary benefits. The Oregon Fruitgrowers' association is another very large concern that has taken the matter up in the same way. This year there has been established a sort of fruitgrowers' guaranty association. Certain commission houses or dealers are to handle the crop. They are appointed in each town and city throughout the country, to which we are adjacent or to which we ship, and the prices are guaranteed. Then, again, those of us who were at Grand Haven last summer will remember the resolution that was presented at that meeting memorializing congress for the appointment of commission-house inspectors, men to whom all our differences would be referred. For instance, in case I should ship a consignment of fruit to Chicago and was not satisfied with the price received, I would immediately enter my complaint to the inspectors; they would investigate the matter. The horticultural society of Ottawa county was considerably incensed because this state society would not adopt that resolution at that time without further investigation. A year ago last season, at Grand Rapids, we organized something of a society. While there was no real organization, except that a dozen of us, neighbors, went in together and agreed to put our fruit in and ship it through one arrangement, and we did so. It was not graded at the central packing house, we brought it in as we had a mind to. It was shipped in carloads exclusively and all went to New York state. That was in the summer, the fall of 1896, with our glut and our enormous crop; and while that one time it worked very satisfactorily, I do believe that every member of that association was fairly well satisfied with the prices we received. I think our fruit brought us a net return of something like 69 cents per bushel, the whole amount of fruit we shipped, something like 9,000 bushels. We shipped altogether sixty-seven cars through that agency, and got our pay for it all right. At the same time, I do know that it would be an absolute impossibility for the same people to get together again and do the same thing. This may seem strange, but it is true. While, as I say, it was fairly satisfactory, little matters came up, little differences and little jealousies, and the same people could not and would not come together in the same manner to do the thing again. There is necessarily a loss in handling fruit in a glut, when you are rushing fruit and are rushed in picking. I remember one time I had a carload of my own fruit that went "warm" or "hot" as they tell about, on the road. It was fully ripe enough when it was picked, should probably have been shipped the day before. It was iced, but perhaps not iced as well as it should have been, and it was re-iced. Nevertheless it went down. It had to be sorted, and the consequence was I lost ninety bushels of fruit out of that one car. Well, there were some others had fruit in that day, and it seemed to be somewhat peculiar that I should lose a whole carload of fruit at that time. So those little matters come up. It is hard to get together, it is extremely hard, unless there can be some strong association. I have always thought that none of our associations are strong enough, that we should have an association of fruit shippers, a central packing association, in which the board of directors should have absolute control of the whole thing, and if people did not like the way they were used all they would have to do would be to drop out.

Mr. Hale: There are one or two points that Mr. Graham brought up, about jealousies creeping in. I noticed this season, at the beginning, certain ones were very slack in marketing their fruit, as to the condition they would bring it to the packing-house; their fruit was inferior, small. Of course we graded it, but did not grade it into the high grades. When they came to get their pay they asked, "What is the matter? I have not as much as my neighbor has." The books were of easy access to them. I formed a plan so that they knew just how their fruit was grading. I would point them to the book and say, "How is your fruit grading, and how is your neighbor's fruit? Should it not bring more than yours?" After they saw these things they said, "That is all right, that is just; we will pay more attention to growing better fruit," and I do not anticipate we are going to have any trouble.

Mr. Chase: I wish to call attention to one point which was referred to, but which was not enlarged upon as I hoped it would be, and that was the establishing of one grade for all classes of fruit. It seems to me that that would be the most unsatisfactory plan that could be made. For example, you take a variety that grows large, like, we will say, Northern Spy. There would be no gradation of that kind of fruit whatever, it would all go into the highest grade. On the other hand, take another class of fruit which is highly flavored but never grows large, like Wagener apples, for example, not more, perhaps, than two inches or two and a half in diameter, that would go into the lowest grade, when in fact it should bring a very high price. It is a very highly flavored fruit, and if the grower of that apple must take his chances with the very smallest grade or lowest grade of some apple that grows large, there would certainly be great injustice done him. It seems to me that the only way to grade apples, if they are to be graded, or any kind of fruit, in fact, is to make a separate grade for each variety, for No. 1, 2, 3, and 4 of Northern Spy, and No. 1, 2, 3, and 4 of other varieties. It would seem to me a very serious objection to the plan of grading which was suggested.

Mr. Hale: Well, it is a matter of detail that can be remedied, but I think the general grade is better.

Mr. Morrill: The question is, whether No. 1, 2, and 3 refers to the size, all mixed in together, or whether as No. 1, 2, and 3 Spys and No. 1, 2, and 3 Wageners.

Mr. Hale: Well, this season we did not have many apples, of course. I can see how a point might be made of that, but in peaches that does not make so much difference. You could call Spy No. 1 Spy, and Jonathan No. 1 Jonathan, so far as that is concerned.

Mr. Morrill: You expect to look up apples when you get a crop? Mr. Hale: I do; yes, sir.

Mr. Slayton: I should think everything could be equalized by having every package marked the variety of fruit and each variety as having a No. 1, 2, and 3.

Mr. Morrill: When purchasers once buy peaches from Mr. Hale's company and see they are No. 1, they have an idea of what that company considers No. 1. If they can receive them again and again, they know there will be no deception, and then they adopt it. They understand that standard. They go on the market and deal on that basis, and can do it with perfect safety, so that a difference between a standard of size that this company may adopt and that which some other company may adopt would not affect either company. They stand on their own merits. If their standard is higher than that of some other company, their sales and prices will be better. That is true with individuals, and the only advantage a company has is that they have enough fruit of any stated variety to meet the requirements of the buyer, while very few individuals have enough. The buyers today are looking for carloads where ten years ago they were looking for cart-loads. That is the advantage in this. Is not that so, Mr. Hale?

Mr. Hale: That is the fact.

Mr. Morrill: That is about the way business is managed in the cities in the purchase of fruit.

Mr. Hale: I wish to make one statement in regard to the cost of our output this year, what it cost us. We bought our baskets quite early in the season. If we had waited we might have saved something. We had them stored in our packing-house, placed there at our disposal. We bought them before the price of baskets went down so low as it was afterward. We might have saved two or three dollars per thousand. Consequently, in some of those lines, we might have done better if we had not been quite so eager to purchase early.

Mr. Morrill: Like everybody else, you will learn by experience.

Mr. Hale: Well, we were not dissatisfied at all.

FLORICULTURE.

BY MR. J. W. HARROD OF ITHACA.

The subject assigned me is so vast in its scope that when one anticipates considering it in public he is lost to know how to handle it, especially when he can not surmise who his hearers shall be. Could we but be assured that all were lovers of flowers, the task were not hard; but we find so many, especially men, who apparently see no beauty, except it be in a horse or a hog, that we can not help hesitating somewhat in approaching the matter.

In these days, when the rush and scramble for the almighty dollar is so great that men by thousands will leave home and friends for uncertainties in the Klondike, facing all kinds of privations, desitution, and death, that they may become rich quickly, we can but wonder how far man will depart from the image of his Creator, the author of the beautiful.

How few there seem to be who have heard the Master say, "Consider the lilies of the field," how they grow. More glorious are they than the greatest king that ever ruled a kingdom. It is true, however, that once in a while we meet a man who dares admit that he is "a regular old woman for flowers." What an expression! What has brought about such a state of things? we ask, and the only solution is that in the primitive condition we have found things, we, in our haste to improve, destroyed the beautiful wildlings of the forest without a care, and became absorbed in making the soil produce only another crop of flowers—for what do we grow but flowers? Farmers talk about the first bloom of this crop and the second bloom, never thinking of the beauty of the minute flowers. Then again, how they deplore the fact that it needs so much Paris green to kill those pesky bugs who are bent on devouring those flowers that try to bloom on the vines, and must if we get any potatoes.

But to our subject—how they grow. What is there that so cheerfully greets us as soon as the snows and blasts of winter have gone, as do the flowers of the woods—yea, sooner than they, the snowdrop and crocus in the garden, so quickly followed by the tulips and hyacinths? So bright and gladsome are they that the most ignorant is attracted, and ask, "what are they?" "They are from bulbs that we planted." "When?" "Last fall." "Well, now, they are pretty. I guess I'll get my wife some of them." But he forgets, as easily as when he left the mirror how grey his locks were growing. We have often planted these earliest beauties in midwinter (during a break-up), and been richly repaid for our pains.

We can not dwell long on any one phase of this subject. There are many bulbous plants we might mention—grand lilies that are perfectly hardy and no further care than the first planting in a well-drained soil, without a particle of manure at the roots; summer flowering bulbs without number are there, that we must pass by, incidentally mentioning the flaming gladiolus, so interesting in its varied colors that we can not slight it.

Perhaps the most interesting part of our labor of love in this beautiful realm is the raising of plants from seeds. This, it seems to me, should early occupy the attention of every child in school. What wonderful properties are stored in the tiny speck! All it needs is a little warmth and moisture, and behold! there is life. Well do we remember the admiration of our childhood days, at the sight of a bottle covered with a piece of flannel cloth on which had been lodged some mustard seeds; and, kept moist and warm, was in a few days covered with a beautiful coat of green—not a particle of soil near it. Any good friable soil will do for flower beds, sandy loam preferred; and for starting annuals and vegetable seeds, use boxes from two to three inches deep. Firm the soil well, make the surface level, scatter the seeds thinly on the surface, then sift just enough soil to cover them; water carefully, so as not to wash them together into groups, cover with a piece of window-glass, and in a few days, with even temperature and good seeds, you will have plants.

Most plants improve by transplanting. People, as a rule, are afraid to transplant, but that is the means by which we get sturdy plants.

Who is more richly repaid for his labor than he who plants a seed or shrub or tree? Who has conduced more to the public welfare? Who has not been refreshed by the sight of well-kept flower-beds when in a strange city, or waiting for a train, all alone in a strange place? Who can tell how many hearts will be gladdened at the sight of the bank of blossoms you will get from five cents' worth of nasturtium or of sweet pea seeds planted in some out-of-the-way place, covering quickly some unsightly object and transforming it to a place of beauty? No special apprenticeship required for such work, simply the getting at it.

We shall be compelled to mention but casually the asters, phloxes, verbenas, poppies, hollyhocks, all old stand-bys but indispensable.

Many of our beautiful flowers, while produced from seeds, can not be perpetuated by seeds, because of the crossing and changing by contamination with their species. So we resort to propagation by other means—cuttings (or what the ladies call slips), layering, budding, grafting, etc. The most common and more easily practiced is by cuttings. According to the nature of the growth of the plant is the condition in which the cutting is taken. In what we commonly call our soft-wooded plants, such as geraniums, heliotrope, fuchsias, etc., the cuttings are taken when the plant is full of vigor, and the new growth, full of sap, will not bend double but will snap almost entirely off. These, placed in clean sand, will root in about two weeks. In hard-wooded plants, as roses and shrubbery, more thoroughly ripened wood is used. Cuttings as usually taken have at least two buds or eyes, from which the growth is obtained and a new plant secured, always a reproduction of the parent plant. An old practice among our fathers was to allow the cuttings of soft-wooded plants to remain suspended on the plant by the lower edge of the bark, until calloused. Not being entirely severed, it would be sustained by the flow of sap through the bark which supported it until the lacerated portion was calloused or partly healed over, taking perhaps a week's time. Then, when placed in sand or soil, roots would soon be emitted from the calloused part.

Vines are usually laid on the ground, covered in places by soil. An incision on the under side before being covered often aids in the callousing process. This is the way we get climbing roses, hardy shrubs, clematis, etc. The method of budding is practiced largely in some varieties of rose, especially our hardy hybrid perpetuals. These are grand indeed, but great watchfulness is required lest the wild stock on which the beauty has been budded send up shoots so vigorous as to dwarf and kill the better rose. Our advice, for hardy roses is, buy only such varieties as will make growth enough to bear well, and be sure to have them on their own roots. Everblooming and tea roses can be propagated by cuttings and are as satisfactory as any plants grown in our garden.

So bountiful is nature that it matters not what the situation, some flower is suited with it. Never so cool and shady a spot but Flora is there in some form. Of course, the question of soil will have some bearing here as elsewhere. Drainage is almost universally necessary. Soil, about which so many are troubled, can easily be had if pains are taken in time—a little care to gather the leaves that fall around us, pile them up, throw on occasionally a few sods and a pail of slops from the house, with any waste vegetable matter. This, turned over with the spade once or twice during the season, will supply any household with good potting soil for winter-blooming plants, etc.

A few thoughts have occurred to me along the line that I spoke of, regarding the children's notice being called to this matter in the schools. I had thought that perhaps, in connection with Arbor Day exercises, something might be utilized from the departments that would instigate a little more teaching in the public schools, or might be applied in some way to the matter of floriculture. It might be beneficial to the people. It seems to me that if any place needs to be made more beautiful it is the surroundings of the common school-house. The children grow up with nothing of the beautiful around them, comparatively.

NURSERY AND ORCHARD INSPECTION.

BY U. P. HEDRICK, MICHIGAN AGRICULTURAL COLLEGE.

A law "to prevent the introduction and spread of San José scale, or other injurious insects, or of infectious diseases of trees, vines, shrubs, or plants, grown in this state, or imported from other states, provinces or countries," was passed by the last legislature.

The law was the outgrowth of a need, expressed in the preamble just given, brought most forcibly to the attention of the horticulturists of the state by the discovery, during the summer preceding the meeting of the legislature of 1896-7, that San José scale, one of the worst of all insect pests, had secured a firm foothold in several parts of the state.

Up to this time the menacing presence of San José scale in several neighboring states had caused but little alarm to fruitgrowers in Michigan. But few orchardists in the state knew much, if anything, about the pernicious pest, and probably none realized the danger that threatened their orchards. An investigation of the matter by the experiment station authorities revealed the full gravity of the situation, and as the danger became better understood and as it was realized that should the pest become generally distributed in the orchards of the state it would there remain a standing menace, a constant foe, without hope of final extermination, a call to arms was sounded. Fruitgrowers and nurserymen, generaled by the State Horticultural society, the State Board of Agriculture, and the authorities at the experiment station, responded. The outcome was a bill, which was introduced in the legislature by Representative Graham of Kent county. The bill became a law, and the contest between the commonwealth and the small but numberless and devastating foe was on.

It may be well to refresh your mind as to the general import of the law. The act has five main provisions, to secure the enforcement of which an inspector, known as state inspector of nurseries and orchards, is appointed by the State Board of Agriculture, and penalties of fine and imprisonment are provided for violations of the law. The five provisions may be briefly stated as follows:

1. That in case the inspector find no dangerously injurious insects or diseases in a nursery, he is to give the owner of such nursery a certificate to that effect; but if such pests be found, the owner of the nursery must be notified, in a specified manner, to exterminate the pest before delivering his nursery stock. The inspector may enter affected nurseries and take measures necessary for extermination of the pests, holding the owner liable for the costs of such proceedings. A per diem fee of $3 is required for the work done under this provision. A violator of this section of the law may incur a fine of $1 for every affected plant shipped from his nursery.

2. Every package of trees or plants shipped into the state must be plainly labeled with the name of the consignor and consignee, the contents, and a certificate showing that the plants have been inspected

by a state or government inspector, and that they are free from all dangerously injurious insects and diseases. All common carriers are held responsible for the enforcement of this section of the law in regard to the stock carried by them. A conviction of violation of the law on the part of any carrier may entail a fine of $100 or an imprisonment in the county jail for from five to thirty days.

3. All dealers in nursery stock, on or before the first day of August each year, must apply and pay a fee of $5 for a license; they must also give a bond of $1,000 each, conditioned that they will keep the law and comply with the clause therein requiring that upon demand a list of customers and the trees sold to them be filed with the State Board of Agriculture. Failure on the part of any dealer in nursery stock to file such a list renders him liable to a fine or imprisonment.

4. The law provides that no dealer in nursery stock, resident of another state, shall do business in this state without having a license, giving a bond, and having a certificate of inspection, as required of residents of this state.

5. A provision incidental to the main import of the law is that the state inspector act as a referee, with final decision, in case owners of peach orchards and yellows commissioners can not agree as to trees supposed to have yellows. It is also the duty of the state inspector to examine every orchard supposed to be affected with dangerously injurious insects or diseases, and authority is given him to enter any such orchard, and if the pest be found, to exterminate it, the expense of such procedure to be assessed and put in the taxes levied on the premises concerned.

All expenses incurred under the provisions of the act are audited by the State Board of Agriculture and paid out of the general fund of the state. All money collected as fees under the act are paid into the general fund of the state treasury.

Owing to the fact that the services of a proper person to act as inspector could not be obtained, to the very great annoyance of the nurserymen, the law, which should have taken effect the first of August, was not put in force until nearly two months later. With this lengthy handicap in time, the inspector began work, and since then, September 25, has been chiefly occupied in visiting nurseries. The inspector has held that, before a certificate could be given to the owner of a nursery, the nursery must be apparently free from indications of San José scale, and of black aphis on the roots of peaches. There must also be a comparative freedom from the gall, affecting most commonly the roots of peaches and apples, and from the woolly aphis on the apple. It would be well indeed for the purchaser of trees if the inspector could insist that the stock be free from both these pests before granting a certificate, but the prevalence of the first named in the majority of nurseries, and the last named in all but one or two blocks of apples so far inspected, makes it impossible to insist this year. However, all nurserymen have been warned that if trees affected with either the gall or woolly aphis were sold by them, there might be trouble. Considerable stock sent out by the various nurserymen visited comes under my observation, and there is every reason to believe that much care is being exercised by shippers in sending out stock affected by these two pests. In all, sixty-five nurseries have been inspected. In three of these San José scale has been found, and in one black aphis on the roots of peaches was discovered. There remain to be visited about fifteen nurseries.

Many friends of the law feared that nurserymen might evade inspection by claiming exemption through a provision of the law that "persons engaged in fruitgrowing, who are not nurserymen but who desire to sell surplus trees and plants of their own growing," do not require inspection or license. In the work of inspection, it has held that any grower of nursery stock who advertises stock for sale, solicits orders, has agents on the road, or who buys and re-sells, is a nurseryman, and must have a license to sell trees. No nurserymen coming under any of these heads as yet have evaded the inspection. In fact, almost all have been anxious to have their stock inspected, and look with favor on the law.

Twenty nurserymen in other states have taken out licenses and given bonds, and have a right to sell trees through agents in this state. Nearly as many more are doing a wholesale business in the state through dealers and can not be made to take out licenses. All stock shipped into the state by them, however, must have a proper certificate. The railroads are doing well in the matter of reporting consignments of trees not bearing certificates. When consignments are reported not bearing certificates, the consignor and consignee are notified that the law has been violated. Generally the result is that the shipper takes out a license. If thought necessary, the trees are inspected.

There are on my list about 150 tree dealers or jobbers, men who grow no trees, but buy and re-sell. Of these about twenty-five have taken out licenses. Some of them did so promptly and willingly, some did not. I have yet the Herculean task of convincing 125 dealers that the law is not unconstitutional; that a man can not act as an agent for a nurseryman without the nurseryman's consent; that the law is not the greatest outrage ever perpetrated; and that, finally, they must, absolutely must, have a license to sell trees in Michigan. Many of the dealers are becoming bona-fide agents.

As yet there has been but little to do with agents. There are, I judge, about 500 of them in the state. As soon as the nurserymen and dealers have all taken out their licenses, they will be asked to furnish the names of their agents. This having been done, it is hoped that a list of all persons having a right to sell in the state (nurserymen, dealers, and agents), may be published and copies distributed to the fruitgrowers of the state.

Lastly, I may briefly speak of the San José scale in orchards. As yet no orchards have been visited for the purpose of officially inspecting them, but by chance San José scale has been discovered by the inspector in one orchard. Previous to the passing of the law creating the inspectorship, however, the authorities at the state experiment station had found the scale in fourteen places in nearly as many counties. Most of these colonies of scale have been exterminated, but several of the most extensive ones still remain. In view of the fact that the scale has been in the state several years, and has been coming in several years, and that three nurseries within our borders have been sending out infested trees, it may be taken for granted that the scale exists in many places where it is yet unknown to be. It is intended that during the winter inspection of all places suspected to be affected shall be made.

In conclusion, it is hoped and believed that in its official contest with the scale, with the coöperation of nurserymen and fruitgrowers, the state will be victorious, that the strong arm of the law will keep from our orchards a foe to them to which any other yet known is insignificant indeed. We ask, in behalf of the law, the hearty support of all persons interested in the welfare of Michigan orchards.

THE NEED OF NURSERY INSPECTION LAWS.

BY MR. O. E. FIFIELD OF BENTON HARBOR.

This subject is not of my own choosing but I was asked to respond to it by Secretary Reid. Since accepting the invitation, I received a programme, and when I saw my name among so many professors, doctors, and distinguished entertainers, I was afraid Secretary Reid had repeated the mistake that the old lady in Vermont made. It is told that a devoted old couple once lived in Vermont, and at the death of her beloved husband the wife wished to have inscribed upon his tombstone an appropriate inscription, to inform those who might read of her husband's character. She wrote the line, "Lord, he was thine", and gave the engraver instructions that she wished it engraved exactly as she had written it. The old lady was unfortunate, as some of us are, in being a poor speller; but the engraver did as requested, and when complete the inscription read, "Lord he was thin"! The subject, however, is of such general and vital importance, not only to the nurserymen but fruitgrowers and planters, that though this paper be as uninteresting as a dose of whale-oil soap, yet you will have to hear it through.

It would seem that during the past four or five years, and specially during the past two years, the bulletins of the department of agriculture and of the state experminent station, the works of Professors Smith, Comstock, and others, and the numerous horticultural publications throughout the United States, had informed all the people sufficiently of the need of inspection laws. But such is not the case. Nearly all of us are fruitgrowers and seemingly intelligent planters, who today are studying the catalogues and corresponding with infected nurseries for cheap stock. They do not seem to consider quality, grade, nor purity, but the "tip" is given the nurserymen to whom they write that "the lowest bidder will secure the order." It reminds one of the man who went to a shoe store for a pair of boots and asked for the largest pair the merchant had. "Haint you got none bigger?" he asked. When assured that the pair he held was as large as could be made from the hide of a four-year-old steer, he bought them. It was a case of the most hide for the smallest expenditure. The trouble is, too many people are looking for more hide, and as a result we find our nurseries and orchards endangered by the cheap stock, made cheap, often, because of infection by dangerous disease or insects, and planted by men who, after they discover the stock is infected, absolutely refuse to do one thing for our protection.

Today there are twenty of the Eastern and Atlantic states that are colonized by San José scale, all of which are responsible to nursery stock for free transportation. Some of the largest Atlantic nurseries have become so infested by the scale that it has not been safe to purchase stock there for the past four or five years. Though these facts have been published repeatedly, and discussed in horticultural meetings for years, yet we are astonished at the large number of Michigan customers these nurseries have. We were very fortunate in stopping a large shipment of infested stock, last spring, and as the circumstance will make a good illustration at this time, I will relate it.

Near the close of our last spring's packing season, a fruitgrower living north of our city came to the packing-yard wishing to purchase a bill of trees. We could furnish most of the varieties he desired, but, on account of the lateness of the season, all of a few varieties had been sold, and we knew they could not be had at that time of any reputable firm, and told him so. We tried to furnish him what we had, but he replied that if we could not furnish all we could not have the order. This man went at once and selected his varieties from the catalogue of an eastern concern, enclosed a draft for $40, and waited for the stock. About a week later, while at the freight house, we noticed a large box and bale consigned to him. Our suspicions were aroused when we discovered on the tags attached the name of an infested nursery. Parting the straw on the bale, we found that it contained cherry trees and San José scale. When the purchaser came we told him not to move it, but to investigate the results of setting such stock. A sample was sent to the Agricultural college, whence reply was made that it was badly infested by San José scale, and they wished to know where it came from. By the time we heard from the college, the purchaser concluded he did not want the stock; but, as the Eastern concern had his money, he did not know what to do. He notified them at once that he would not accept the stock, and sent affidavits to prove that the whole lot was alive with scale, but the company absolutely refused to refund the money and they never have done so up to date. To the credit of the planter, I wish to say that he took the stock, box, and packing and burned them all together, near the freight house. But for our timely discovery of this case, this man would never had known that he had the scale, perhaps, until his whole farm had become infested and his business ruined.

In the absence of a nursery and orchard inspection law, if this lot of trees, which is the same, we are afraid, as many lots delivered in this state—I say, in the absence of law, if this lot of trees had been set beside your orchard, thereby threatening your business, what would you have done about it? If he furnishes scale enough to destroy thousands of dollars' worth of your orchards, and completely ruins you, you could not help yourself, you could not reach the nursery that sold the stock, and to destroy the trees, without your neighbor's permission, would be to incriminate yourselves.

We as nurserymen have realized that a small fruitgrower, who only wished a half dozen trees or plants, is likely to purchase them of an infested nursery and plant them beside our nursery, thereby endangering and possibly ruining our industry.

The men who are the most likely to import infested trees or plants are the ones who are looking for the cheapest stock, and when it is received and planted out they let the pigs, cows, sheep, and horses cultivate and prune them. They use weeds for fertilizing them, and complain of poor crops and hard times; yet, if the yellows commissioner calls upon them, they are ready to defend their poor, scrubby, infested, half-dead trees with a shotgun.

What would we do about it? What could we do about it? That is the question.

We do not fear the pushing, up-to-date fruitgrower or the honorable nurserymen, for if they have the misfortune to get this pest they will stamp it out without compulsion. But I am sorry to say that time has revealed to us eastern nursery firms who, in order to save temporary loss to themselves, have knowingly scattered the dread pest, the San José scale, to the four winds of heaven; so complete has been their work, aided by the buyer and the ignorant and irresponsible jobber in cheap stock, that our nurserymen and horticulturists last winter realized that something must be done quickly to save our great horticultural interests here in Michigan.

The quickest way to call the public attention to an existing evil is for congress or the state legislature to commence investigation. Newspapers are always hungry for news, and the grass was never known to grow under the feet of a newspaper reporter, consequently those who read and keep up with the times often comply with the spirit of a law long before it is passed or comes into effect. A law can not be enforced unless public sentiment is behind it and pushing its officers to carry out its letters. But when public sentiment is sufficiently aroused, so that citizens realize their danger, there is little need of laws. Laws are useful and necessary only by providing a remedy to cure those who diregard their own and their neighbors' safety and welfare.

Realizing, as I think we all do, the need of laws and public opinion, to help fight these insect armies that are making such a successful conquest on our orchards, we must consider what is the best means to adopt, what line of battle shall we map out, when shall we commence the campaign. The law passed by our legislature last winter was a step in the right direction, and in the absence of a national law it is a marked success, so far as regards inspection of nurseries.

What we need is a national law to provide for the inspection of nursery stock, which will strike at the root of the evil, and then revise our state law to provide for the inspection of orchards and fruits. These laws should be framed in simple language, without attempt to be specific; and, backed by the fruitgrowers and nurserymen, they would prove successful.

At the last meeting of the American Association of Nurserymen, last June, the following bill was prepared and adopted by the Association, to be presented at the next session of congress, and it covers the ground so completely, for a national law, that I will read it. It is entitled "An act to provide rules and regulations for the inspection of trees, plants, shrubs, vines, grafts, cuttings, and buds, commonly known as nursery stock, imported into the United States; and for rules and regulations for the inspection of trees, plants, shrubs, vines, grafts, cuttings, and buds, commonly known as nursery stock, grown within the United States, which become subjects of inter-state commerce."

Sec. 1. Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That all trees, plants, shrubs, vines, grafts, cuttings and buds, commonly known as nursery stock, imported into the United States from foreign countries, shall be subject to inspection in the hands of the owner, and before reshipment, sale, or planting out, according to rules and regulations prescribed by the secretary of agriculture, and when so inspected and found apparently free from dangerously injurious insects or diseases, the certificate of the officer making such examination and finding shall be issued to the owner or owners of such nursery stock. A copy of this certificate shall be attached to and accompany each carload, box, bale, or package, and when so attached and accompanying, shall operate to release all such nursery stock from further inspection, quarantine, or restrictions in inter-state commerce.

Sec. 2. Whenever it shall appear to the secretary of agriculture that any foreign country shall have provided proper and competent inspection for nursery stock about to be imported into this country, he may by proclamation or otherwise accept such inspection and certification in lieu of the inspection as provided for in section 1 of this act. This acceptation by the secretary of agriculture shall operate to relieve all such nursery stock, when accompanied by a copy of the certificate of inspection, from further restrictions in inter-state commerce.

Sec. 3. All trees, plants, shrubs, vines, and buds, commonly known as nursery stock, grown within the United States, may become subjects of inter-state commerce, under the rules and regulations as hereinafter provided. The secretary of agriculture shall cause to be inspected all trees, plants, shrubs, vines, and bulbs, known as nursery stock, which are subjects of inter-state commerce, and which are about to be transported from one state or territory, or the district of Columbia, into another state or territory, or the district of Columbia. This examination shall be made prior to September 1 of each year, in the manner provided for and prescribed by the secretary of agriculture, and if such nursery stock is found to be apparently free from dangerously injurious insects or diseases, the certificate of the officer making such examination and finding shall be issued to the owner or owners of such nursery stock, a copy of which certificate shall be attached to and accompany each carload, box, bale or package, and when so attached and accompanying shall operate to release all such nursery stock from further inspection, quarantine or restriction in inter-state commerce.

Sec. 4. That it shall be unlawful for any person, persons, or corporation to deliver to any other person, persons, or corporation, or to the postal service of the United States (except for scientific purposes or by permission of the secretary of agriculture), for transportation from one state or territory or the district of Columbia, to any other state or territory or the district of Columbia, any trees, plants, shrubs, vines, or other nursery stock, which have not been examined in accordance with the provision of section 3 of this act, or which, on said examination, have been declared by the inspector to be dangerously infested with injurious insects or diseases. Any person, persons, firm, or corporation who shall forge, counterfeit, or knowingly alter, deface or destroy any certificate or copy thereof as provided for in this act, and in the regulations of the secretary of agriculture, or shall in any way violate the provisions of this act, shall be deemed guilty of a misdemeanor, and on a conviction thereof shall be punished by a fine not to exceed $500 nor less than $200, or by imprisonment not to exceed one year, or both, at the discretion of the court.

Sec. 5. The rules and regulations herein provided for shall be promulgated on or before the first day of July of each year.

Sec. 6. That the sum of $100,000, or so much thereof as may be necessary, is hereby appropriated out of any moneys in the treasury of the United States, not otherwise appropriated, to carry into effect the provisions of this act.

Sec. 7. This act shall take effect on and after the 30th day of June, 1898.

With such a law as this in operation, all nursery stock would be well taken care of and the primary source of the distribution of the dangerous insects and diseases stopped. The next step would be for our states to provide for inspection of orchards and fruits, and crush out the colonies of scale wherever established. The law must grant much power to the state inspector, as we all know the difficulty that has been experienced in enforcing the peach yellows law.

The following clipping comes from a San Francisco paper of Sept. 23, and is a dispatch from Tacoma, Washington. It shows that our western states are far in advance of us, as horticulturists, lawmakers, and law-enforcers. The clipping reads:

> Horticultural Inspector P. W. Tonneson today began a rigid inspection of California fruits shipped into this city. The steamer Walla Walla arrived this morning from San Francisco, bringing considerable fruit, including apples, grapes, quinces, and lemons, which Inspector Tonneson had piled up in the warehouses for inspection before delivery. One shipment of apples was condemned because found wormy and unfit for market. Other shipments are undergoing careful examination. The object of the inspection is to prevent importation of the San José scale, the codlin moth, and poor fruit.

I think it is time that we should follow the example of our western brethren, enact laws, create public sentiment, and redeem our lost reputation as a leading horticultural state.

Only this fall I was told by a Chicago commission man that all he had to do to stop a sale on a consignment of apples, was to tell the customer that they were from Michigan.

I am informed by people who live in Chicago that when they know that fruit is from Michigan, they are afraid to buy it, as the packages are invariably "stuffed" with wormy, inferior, and worthless trash.

Can we expect commission men to send us large returns, if we permit our people to continually rob their customers in this way?

The day is at hand when we must shout halt! to our fruit-raisers, and commence a reformation to redeem our character in our great home markets, which have no equal on the globe.

I believe that the horticulturists and nurserymen should unite in recommending a national law to our next congress, and revision of our present law to our next legislature. I think the conditions for inspection legislation and the enforcement of the same are now at hand.

DISCUSSION.

Mr. Morrill: Gentlemen, we have listened both to the state inspector and one of the inspected. They both have opinions in the matter and they are both competent to answer any question you may ask them. This to some of you may be a new affair; some of you may not be familiar with the causes, as explained in the last paper, which have led up to enactment of this law; but whether you are or not, if you have any orchard interests it will pay you to learn something of the necessities of this law as well as the workings of it. Prof. Taft was in the work some time before there was a law enacted, investigating and looking to see if there was necessity for it. Many of the fruitgrowers have been familiar with the necessity for it. It is only just now being put into practical operation.

Secretary Reid: Perhaps I may as well read now as at any other time a letter I recently received from Prof. F. M. Webster, entomologist of the Ohio experiment station.

THE OHIO AGRICULTURAL EXPERIMENT STATION,
Wooster, Wayne County Ohio, Nov. 15, 1897.
Mr. Edwy C. Reid, Allegan, Mich.,

My Dear Sir: Yours of 9th at hand, as also copy of your paper containing my letter. I am wholly in sympathy with you or anyone else in preventing the spread of San José scale over the country. It seems to me, however, that you are overdoing the matter in advising a general boycott of Ohio nurseries, where there is no danger that I am aware of but from one, and this is no more than there has been in patronizing some Monroe, Michigan, nurseries the last few years. I have two infested orchards, the trees of which came from there.

Then, again, what earthly use is there in giving such a certificate of inspection as your State Board of Agriculture is doing? No one for a moment believes there are no injurious insects in the nurseries of Michigan, or any other state. Mayor Harrison might issue a certificate to the effect that there were no thieves in Chicago, but it would not help Chicago in the least. It is simply folly to attempt to misapply a law in this way, and is sure to work more harm than good. Restrict your law to not to exceed three pests and name these in your certificate, and you will not bring the whole system into disgrace.

I do not intend that any San José scale shall be sent out from Ohio if I can help it, and I do intend that it shall be wiped out of the one nursery that it infests, between this and spring; but unless there is a vast change in the wording of some certificates that are being demanded and given, I shall have nothing to do with nursery inspection. No man with a reputation to lose, or who expects to ever have one, can afford to do so.

Yours very truly,
F. M. WEBSTER.

Mr. Reid: In a prior letter Mr. Webster stated that he started in on the work of nursery inspection in Ohio, but as there was no law providing for such inspection the State Board of Agriculture had caused him to desist from the work. I presume he is laboring under the impression, which has gone out from some of our own nurseries, to the effect that the certificate given by the inspector declares the nursery to be free from those pests, when it simply declares that the inspector has not found anything of the kind. I believe that is the case, is it not, Mr. Hedrick? Mr. Hedrick: Yes, sir.

Mr. Reid: He perhaps got hold of some advertising matter, or some statements from Ohio nurserymen, or some distorted idea of it in general. I thought the letter sufficiently interesting to produce here.

Prof. Taft: I noticed one or two things in the letter of Prof. Webster of which I would like to speak, and one is as to what he says regarding the Monroe nurseries. I will say that I visited Monroe with Prof. Webster, some two years ago, to investigate this charge that he makes, and we were convinced that there was not at that time, and we thought there never had been, any San José scale in the nurseries as charged. We did find a few trees that had come from the Monroe nurseries, but by examining the books of the nurseries we were convinced, from their bills, that they had bought these trees and had merely repacked and shipped them, and as the nurseries are two or three miles from the packing-ground it would show that the nurseries themselves had been free from it; and, so far as I know, and I think I understand what he is charging, the scale was never anywhere near the Monroe nurseries where it could infest them. As to the other point he makes, regarding the insects for which the certificate is given, I would say that Prof. Webster, this last year, has given a certificate stating that he had examined certain nurseries and found them free from San José scale. He does not say any further than that.

Mr. Morrill: Does he put it so broadly; finds them free?

Prof. Taft: That he apparently finds them free. Our law requires that they shall be examined and the certificate shall state that they appear to be free from the dangerous insects and diseases, as the inspector has told you. He has considered the black aphis of the peach a dangerous insect, also black-knot and yellows and crown-gall. Prof. Webster wrote me that he could not inspect nursery trees for the crown-gall or black aphis until they were dug, and that yellows never appears in the nursery. Regarding the crown-gall and aphis, from what I have seen of nursery trees I am convinced that a person who is going through a nursery to inspect it would be likely to notice appearances that would indicate the presence of this insect or this disease. He would merely have to make a close examination; that is, the appearance of the trees infested with black aphis would be indicative of its presence, and just so with crown-gall. In nearly every case, without taking every tree and examining it, you would be able to detect the presence of that disease. It seems to me that the wording of our law is as it should be, that the certificate should state that the inspector has found them apparently free, or that they appear free, from the dangerous insects and diseases, and then the authorities can define what shall be counted as dangerous insects or diseases. It seems that our inspector has gone no further than he should, and that the inspectors of other states, as has been the case so far as I know everywhere, except in Ohio, can give a certificate stating that they appear free. The certificates from Florida, Maryland, Delaware, New Jersey, and New York, state that they appear free from all insects and diseases.

Mr. Graham: I am certainly surprised at hearing this letter from Prof. Webster, inasmuch as I have his certificate, over his own signature, recommending the passage of this law, practically in its present form, absolutely in its present form so far as this certificate is concerned, certifying that he has examined the proposed law and considers it all right.

Mr. Morrill: An unqualified endorsement?

Mr. Graham: An unqualified endorsement, which was presented to the legislature as one of the reasons why the bill should be passed, as having the endorsement not only of Prof. Webster, but the professors, I think, of eight different states. There seems to be a vein of bitterness through the letter.

Prof. Hedrick: Prof. Taft has answered the letter written to Mr. Reid so well that there is no need of my saying any more, except that I spent nearly a week in Monroe this year and found no indications whatever of San José scale. I made a very careful inspection of all the nurseries there. The owners of the nurseries did all they could to assist me in making the inspection, and I feel sure that Mr. Webster is mistaken in the statement that there is San José scale in Monroe.

Mr. Morrill: You are not clear in your mind but it has passed through Monroe?

Prof. Hedrick: It may have been through Monroe, yes; I know nothing at all about that.

Mr. Graham: I desire to ask Prof. Hedrick wherein he considers the law weak—what are the weakest points in the law? Where would you remedy it, what improvements would you make?

Prof. Hedrick: I do not know that I could well answer off-hand, but there are several improvements that might be made. The first that comes to my mind is that power should be given the inspector to condemn trees that are shipped into the state that have gone through the hands of some other inspector, and which have not been carefully inspected. For instance, shipments of trees having black aphis might come into the state, and if they had been inspected by a state or government inspector and given a certificate, a dealer in this state might sell them.

Mr. Morrill: Even though they are infested?

Prof. Hedrick: I have no power under the law to make him destroy the infested or infected trees.

Mr. Graham: Have you not, under a subsequent section, power to follow up such trees in the hands of the purchaser?

Prof. Hedrick: I have; yes, sir.

Mr. Graham: Wherever you find them?

Prof. Hedrick: Yes, wherever I find them, but I should have the power, I think, to make the original purchaser, the dealer, destroy the trees or care for them. I think it is a mistake not to make the agents take out a license. The law would have been nearly self-sustaining had that been done. I believe that many of the agents would have gladly done this, because a great many have asked for certificates. Of course, the principals are resposible for the agents, but the agents bob about so that it is very difficult to keep track of them. Other weak points in the law have come to my mind, but I do not think of them now. One provision is practically a dead-letter, and that is the one requiring that all outside dealers take out licenses. The secretary found, in looking the matter up, that a person might order trees through the mail from this state, the trees to be shipped in here, and you could not get after them at all. The trees would have to be accompanied by certificate, of course, but you could not compel the man who shipped the trees into the state to take out a license or bond.

Mr. Morrill: This proposed national legislation will hit that; it seems to be the only way.

Prof. Hedrick: Another feature I think might be introduced into the law would be to put the state inspector somewhat at the head of the peach yellows commissioners, give him charge of the work, so he could see that in townships where people were inactive in regard to having commissioners, they could be made to have commissioners.

Mr. Morrill: I think that is all right.

Prof. Hedrick: And compel the inspection of peach orchards; and he might oversee the work of the commissioners and see that it is done much better than it is under the present system.

Mr. Graham: What is your opinion, professor, regarding the section exempting fruitgrowers who are not nurserymen from the inspection?

Prof. Hedrick: Well, a "nurseryman" ought to be better defined in that provision. So far I have had no trouble, but I can readily see that there might be trouble, and if a case were taken to the courts a good many nurserymen might creep out. The nurserymen have been anxious for inspection, and I have had no difficulty in making them see that they ought to have their stock inspected, but at the same time they might creep out if the matter came before the courts. I think the provision all right to a certain extent. A great many growers of strawberry plants, respberry plants, and other small-fruit plants naturally have a surplus of stock, they do not go on the road, and they do not advertise their stock, but the neighbors come to them and want plants. Perhaps they ought to be allowed to sell, and the provision for them is all right. It seems to me so at least.

Mr. Morrill: I think the unfortunate part of that is that it weakens the law.

Prof. Hedrick: It does weaken the law to some extent. I think also there ought to be a provision in the law enabling the inspector to publish a list of the men who have a right to sell in the state, and enabling him to publish a list of the work that he does. Such a report would be very valuable, I am sure. There is no such provision, but I doubt not that the auditor general will audit a bill for the printing.

Mr. Morrill: I think that is true, I think that information ought to go to the public.

Mr. Morrill: I think if a report of that character could be issued as the experiment station bulletins are issued, it would have value, but if it had to wait for any of the annual society reports in the present condition of state printing, I think it would be so far behind that nobody would ever recognize it when they saw it; everybody would be in advance of the report.

Mr. Hedrick: I agree with you, Mr. President, in that respect, and I think the reports ought to be issued promptly. I ought now to be making out a list of men who have a right to sell trees in this state. I think perhaps such a list will be gotten out, but perhaps not under the authorship of the inspector. There ought to be a chance for the department to be built up and become an important factor. The issuing of such bulletins would help to make it an important factor in the fruitgrowing of the state.

Mr. Morrill: I believe that such a bulletin should be issued just as quickly as the state inspector could get it out, and be sent to local newspapers, and they would be very likely to reach the licensed agents in their vicinities at least, and would give the growers information in advance of their purchases as to who had complied with the law; but to wait for a state report of any character, it would reach but few people and would reach them too late to do any good. It is undoubtedly a fact that it is going to take a long long time to correct the present haphazard methods of producing fruit trees. The majority of our farmers, when they decide to plant fruit trees, wait for somebody to come along, they have not the slightest idea who it is going to be. The large growers have opinions of their own, and do business as other men do business—carefully, as a rule; but oftentimes a farmer has not been in the fruit business, and concludes in a sort of half-hearted way that he will go into it a little. He does not avail himself of the opportunities of getting information that are open to everybody, because he has not exactly learned how, and perhaps he has not the time; and in the meantime, if he has said anything about it, somebody has suggested to somebody else that so-and-so is going to buy some trees. Very soon some agent—responsible or irresponsible, however it may be—"gets onto him", as they say, and he succeeds perhaps in selling him some trees, without giving him any knowledge of where those trees are coming from. He gets statements from the agent, perhaps, and very glowing pictures of what he is going to get and where it is coming from, but he has no knowledge of the truth of these statements. In fact, there are so many times that they have been untrue that people who have experimented that way became pretty well discouraged later on. Now, if this law will force people to purchase stock known to be right by the proper authorities, or at least have every reason to believe it is right, it will have accomplished one good, because, as was suggested here in the paper read by Mr. Fifield, a person purchasing a half dozen trees and setting them in this village, if you please, can infect or infest every other tree or shrub in this city, and can eventually destroy every deciduous shrub or tree, with this same San José scale, unless the action of the law is firm enough to get in check the foe. There are places in Illinois and several states where this insect, this particular one we are talking about, San José scale, has a foothold, and gradually, perhaps almost imperceptibly for two or three years, has been gaining until it starts out like a prairie fire, gradually at first, but pretty soon it begins to sweep out and cover everything. In one locality in Illinois, which Prof. Forbes told us about at the meeting last year, it had existed about four years; at least, people had noticed there was something wrong with pear trees they got down in New Jersey; they leafed a year or so and then began to look as though they were shriveling. A large orchard adjoining some of the pear trees began to be the same way. They thought something had gone wrong with the soil, but they could not see anything, because they were not looking closely enough to see what the trouble was. This whole orchard went, and the Osage orange hedges adjoining it. This was adjoining a village, trees in which began to be infested; and when Prof. Forbes found it, pretty widespread destruction was taking place, and it is probably going on yet, because it is a pretty large thing to handle. In a search of seventy localities known to have been furnished trees by a certain nursery, they found fifteen of these colonies of greater or less size, all spreading rapidly, and just as sure as fate destroying everything they touched. Today we have a few small colonies already located in this state by Prof. Taft and Prof. Hedrick and their assistants, who are taking proper precautions to stop them. Now, a careless purchaser could introduce this insect into your village. Your ornamental trees are subject to its depredations and the same destruction that our orchards are. The best informed horticulturists in the state will probably now make no mistake, although the very best informed among us were not aware how serious this matter was until within a year or two. The scientists understood it, but it has been a California pest. They did not suppose it was in this part of the country, and today there is an open question with the scientists as to whether it will survive this climate; but there is a locality near Dixon, Illinois, that is colder than this. Perhaps humidity of the atmosphere enters into the question. I believe they think it does.

Prof. Hedrick: It has survived Michigan climate seven years. Some orchards are full of it in Kalamazoo county or south of Kalamazoo county.

Prof. Taft: And eastern Ottawa, near Jamestown.

Mr. Morrill: Well, you can see what this law means to the fruit interests and to the village and city interests in this state. It is a very important thing, and should be carefully studied, and perhaps the whole system of selling stock carelessly will be headed off by this law. It is intended that it shall be, and nothing but clean stock shall be sold to any residents of the state of Michigan. But that requires co-operation on the part of every individual that has any occasion to buy any shrub or fruit tree.

Mr. Kellogg: This scale, as I understand it, is infesting the nurseries of New Jersey quite largely. There are two prominent nurseries in New Jersey that are deluging the whole country with disease, are sending their stock right out. Is that true?

Mr. Morrill: Well, I think it has been, and probably is still.

Mr. Kellogg: Nobody is expected to do another person special injury, but when a terrible thing is given to the people, and it is spreading all over America, to get a few dollars at the cost of the loss of millions, I think it ought to be understood that it is dangerous to send to New Jersery for nursery stock of any kind. I believe that Parry & Lovelace—it is their misfortune, but they are all alive with it, as I understand, and I would like to inquire if it has been discovered around Rochester—has there been any scale reported from that vicinity?

Prof. Taft: Not much so far as we know. There has been in other localities in New York.

Mr. Morrill: There is one point which cropped out in Prof. Webster's letter read here by Mr. Reid. The largest nurseries in this state are the largest purchasers of fruit trees. While the nursery of any firm may not be infested with this scale, it is a fact that the nurseries, nearly all of them, are compelled to buy certain things with which to fill their orders. This law will compel them to be careful that they buy clean stock; to see to it that the stock is destroyed if it is not clean. The provision which requires them to file a bond to comply with the laws, and to turn over to the state board a record of their sales, is intended that, in case disease or insects of this dangerous character do slip by the proper inspectors and through the hands of agents, and are finally discovered in the orchard, there will be a record as to who delivered the stock, and the name of every man to whom he made delivery. Then the inspector can immediately inspect all the stock that may have been delivered at that time. It is the object of that part of the law, that the Board of Agriculture shall have its finger on every man's business, and if by accident or oversight in any way, or through carelessness, a nurseryman introduces trouble, all his stock may be followed and inspected. It is hoped that this will prove one means of catching any trouble and of catching it early.

Prof. Tracy: I would like to ask Mr. Fifield as to the advantage or disadvantage, or the propriety or impropriety, of a large commercial establishment allowing an inspector or anybody else to have just that sort of finger on their business. As representing a large nursery, do you think it is good business policy to have a list of your customers published or made public?

Mr. Morrill: O, that is not made public.

Prof. Tracy: Well, it is in the hands of an individual.

Mr. Morrill: No, it is in the hands of the State Board of Agriculture, and to be preserved by them for reference, for their use only.

Mr. Fifield: As I understand the law, we are only required to give a list of our customers when called on to do so by the State Board of Agriculture. We are not obliged to make out a list of our customers each year, as was at first proposed, and file that list each year with the board; but at any time the board requires us to do so, we are to make out a list of all the customers we had during that year, and submit it to them. The object in this is to inform them to whom we furnished stock at a particular time, so that if there has been any one who purchased stock of us and received infested stock, the board may authorize or instruct the state inspector to visit all the other customers and see whether they have infested stock. Of course our company will comply with that law. The only disadvantage I see in it will be a little extra work in getting out the list, and of course we have to rely on the integrity of the board and the inspector to preserve our list and keep it from our competitors. The only risk to run, would be that our competitors might get hold of a list of our customers. Otherwise, it is simply the labor in making a copy of that list, because we have a book in which we keep a record of all of our sales.

Prof. Tracy: I would like the idea of Mr. Kellogg on that point.

Mr. Kellogg: I believe this is a day of calamities, and every honorable man ought to contribute all he can possibly to do away with these diseases, and he ought to be willing to submit to any inconvenience or loss that is necessary for the public good. That is the way I look at it. If his business must be sacrificed, he ought to regard it the same as he would if his house got afire. I am glad to see this law put in force, and I would like to see it enforced rigidly and I should be willing to jump right on the back of any inspector if he was slow in his duty and failed to act where it was necessary to condemn. It is not a day for parleying and using soft gloves; we must get down to the knuckles. I think the law can be effective, that these nurserymen should be required to not dump their stuff upon us.

Mr. Graham: In regard to this matter brought out by Prof. Tracy, ordinarily a physician in his regular practice would not want a public record of whom his patients were and what was the matter with them, and the patients would not, either, in all cases. At the same time, the law steps in and says you must in certain cases. Just so with the sanitary commission, but they go still further. They publish these reports right along, make public notice, and this is on the same ground, exactly. We have the decision of a number of our best attorneys and the attorney general and so on, that that provision is perfectly constitutional and all right. It is a matter of public danger, the introduction of those diseases. The section specially provides that this knowledge shall be for the use of the State Board of Agriculture and their agents alone. From the beginning, those of us who were instrumental in drafting the bill will all agree that it was a difficult matter to draft a bill at all. I know it was the hardest matter that I ever had to undertake in that line. We would get started very nicely on some line or some section, and the first thing we knew we ran hard into a snag, and I think we were two days hard at work in simply drafting the bill after having given it a very great deal of thought. But there was something wrong with every provision, almost every section; and we would get it nicely written out, only to run against something that would be fatal, and we would have to go back and begin again. I believe this provision in relation to notice for the filing of the list with the state board is new. I do not think it is in any other similar law. We ran against a good many troubles. The Maryland law, for instance, provides that every bill of goods that is shipped in, not accompanied by a certificate of inspection, must be held by the common carrier, the inspector notified, and the goods inspected before it is delivered, under a heavy penalty. But they do not attempt to enforce that provision in Maryland, because it is unconstitutional. It also runs squarely against the inter-state commerce law. It is impossible to enact a law in this or any other state, under the inter-state commerce laws, that will be really effectual, without first having a national law. They worked hard at that during the last session. I have several drafts of bills that were sent me by Prof. Taylor, and a good deal of correspondence on the subject, but they could not come to any agreement at Washington in this matter. Now, here was a question of other inspectors brought up by our own inspector—the right to inspect stock that came in here carrying the certificate of other inspectors. The question arises, would they not immediately retaliate in other states? When we ask other states to accept our stock, to accept our goods, under the certificate of our own inspector, what right have we to deny them the same privilege of sending into Michigan stock under the certificate of their inspector? We got around that point, so far as we could, by making it the duty of our own inspector to follow up this stock, if he had any suspicion, and to take it anywhere he could find it. But, mind you, it cuts two ways. If the inspector has an idea that stock is infested, and notifies the person to whom that stock is going, the consignee, that he has suspicions of the stock, he will not accept it in one case out of twenty, because, under our present law, our inspector has the right to go upon his premises and condemn that stock on sight and take it from his possession.

Prof. Hedrick: Supposing next spring I go to Grand Rapids, and dealers were bringing in peach trees by the carload. I find a carload of peach trees bearing, we will say, a certificate of inspection from a New York inspector, and I find on those peach trees black aphis. I would have to let the dealer, if he had a certificate, sell those trees, and I would have to follow them up; would have to demand from that dealer a list of his customers, and then go to his customers and destroy the trees, or make them destroy the aphis, before I could right the wrong at all. It seems to me there should be a shorter way, that I ought to have the right to do something with that carload of peach trees before it was sold.

Mr. Morrill: Is that correct, can you not take that wherever you find it?

Mr. Hedrick: No, I can enter the nursery or enter the orchard.

Mr. Morrill: But can not take stock?

Prof. Hedrick: No, sir.

Mr. Morrill: Where you know it is infested?

Prof. Hedrick: No; that was the point I wanted to bring out.

Mr. Slayton: That law ought to be so that you could catch it as you would a bear—anywhere.

Mr. Graham: Then, again, there are the mail orders. There is another snag that we ran against, and we never found a way of getting around it. We know of no way in which we could handle this question of mail orders. If I write a letter, for instance, to a New York nursery, and tell them to send me a thousand trees, they are not doing business in this state, they are not soliciting in this state, they are not selling in this state. They are selling the goods at home, on their own grounds, and I do not know of any power of the state to compel those people to take out a license, to have their stock inspected, or prevent them from bringing their goods in. I go to them and do business in their state; they do not come here and do business with us, and the only protection we have against that class of stock coming in in that manner is the provision that the common carriers must notify the State Board of Agriculture, and the inspector can follow up the stock as he sees fit, and I do not know of any way to get around it. In passing a law there are some things especially that we have to consider. One is the feasibility of the law, another is the possibility of enacting that law; and this state, I think, so far as fruit interests are concerned, is one of the most difficult states in which to do anything of that kind, our interests in Michigan are so diversified. While we stand almost at the head of the states as a fruitgrowing region, the fruit interests are mostly on our western line of coast. Take three fourths of the whole state of Michigan, and much the larger portion is not at all a fruitgrowing country. A very large portion of the state has absolutely no fruit interests, knows nothing about it, cares nothing about it. The point as brought up by Prof. Hedrick, regarding the control of yellows commissioners, township commissioners, and compelling townships to appoint them whether they wished to or not: When the spraying bill was passed, the first draft provided that the township boards in the various townships in this state should appoint three persons, to be known as commissioners and so on, and went on to define their duties, men in the legislature set up the greatest howl you ever heard. I recollect particularly one man from Ogemaw. "Why", he said, "we have got insects in our wild cherry trees in our forests, and under that bill the township would have to employ these inspectors and pay them $3 per day to go out and spray our forests". That was ridiculous, that was preposterous —such a bill as that was. We have many townships where there are quite large fruit interests, where they have not shown sufficient concern in the business to demand appointment of commissioners; but I do believe it would be an absolute impossibility to put upon the statute books any provision regarding every township in the state, obliging them to appoint such commissioners, simply because the great majority of townships in the state are not interested in fruitgrowing at all, and care nothing about it. Then, as to requiring of the agents a license, the senate changed that simply because they wanted to. I do not think they even advanced a reason why they should do so, but they wanted to make some change in the bill as it came from the house. It is a peculiarity, you know, to put their mark upon it in some manner or other. The senators looked the thing over, and they could not find any easier place to do it, so they cut off that provision, and I think it should be put back. I know of no reason in the world why this law should not be self-supporting and self-sustaining. I understand, of course, that it is a new law, and, like all new things, is imperfect; it takes time, more or less time. Take our yellows law. The first time that was put upon the statute books it was very imperfect, much more so than it is now. That was the reason why I asked the inspector wherein he found this law weak. The inspector should make that a study, and all interested should make a study of the workings of the law during the past season, and find wherein we can remedy and strengthen it, and then do so at the next session.

Mr. Morrill: Take Sec. 2, for instance. It reads very plainly to me: "The owner of such nursery, trees, vines, shrubs, or plants" [that does not mean that they shall be in the hands of the man who grew them] "shall, within the time specified in such notice, take such steps for the destruction of such insects or diseases as will exterminate the same, and he shall not ship nor deliver any such trees, vines, shrubs, nor plants affected with such dangerous diseases or insects, under the penalty of a fine of one dollar for every tree, vine, plant, or shrub so affected, when shipped or delivered from such nursery, which fine shall be collected by suit by the prosecuting attorney of the county in which said nursery is located." The word nursery is capable of some interpretation. I think that is broad enough to cover the case in every respect, and I do not believe any man can deliver infested stock here except it passes inspection, regulated under Sec. 5: "Any person or persons growing or offering for sale in this state any trees, vines, shrubs, or plants, commonly known as nursery stock, shall, on or before the first day of August in each year, apply to the State Board of Agriculture for inspection of said stock under the provisions of this act, and a license for its sale, [there you have got persons 'growing or offering for sale'] and shall deposit with said board a fee of five dollars as a license fee for himself as principal. Such license shall be good for one year and shall not be transferable, and each of such persons, principals, shall execute to the State Board of Agriculture a bond, in the sum of one thousand dollars, with good and sufficient sureties satisfactory to said board, conditioned that he will comply with all the provisions of this act, and that upon demand he will file with the State Board of Agriculture a list of the persons to whom he has sold or delivered any such nursery stock, giving the species, together with the postoffice address of each purchaser, which list shall be held in strict confidence by the said State Board of Agriculture, and not be subject to inspection by the public. Failure on the part of any nurseryman, grower, agent, or dealer to comply with the provisions of this section shall render him or them liable to the penalties of a fine of not more than one hundred nor less than twenty-five dollars, or imprisonment in the county jail for not more than ninety nor less than thirty days, or both such fine and imprisonment in the discretion of the court, for each and every such sale. Such information shall be preserved, and be for the sole use of the nursery and orchard inspector and his deputies." That does not say "nurseryman" at all; it says "persons growing or offering for sale."

Prof. Hedrick: But suppose a man has taken out his license according to this Sec. 5 that you have just read. The law provides in the previous section that any trees coming into the state, having the proper certificate, may be handled by these dealers, and so on.

Mr. Morrill: "Whenever any trees, shrubs, plants, or vines are shipped into this state from any other state, country, or province, every package thereof shall be plainly labeled on the outside with the name of the consignor, the name of the consignee, the contents, and a certificate showing that the contents have been inspected by a state or government inspector, and that the trees, vines, shrubs, or plants therein contained appear free from all injurious insects or diseases. Whenever any trees, shrubs, vines, or plants are shipped into this state without such certificate plainly fixed on the outside of the package, box, or car containing the same, the fact must be reported within twenty-four hours to the State Board of Agriculture by the railway, express, or steamboat company, or other person or persons carrying the same; and any agent of any railway, steamboat, or express company, or any other person or persons who shall violate the provisions of this section, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than twenty-five nor more than one hundred dollars, or imprisonment in the county jail not less than five nor more than thirty days, or may be so fined and imprisoned in the discretion of the court; and any such fine shall be paid to the State Board of Agriculture." Now, that provides that they shall not receive and bring goods into this state except they have been inspected; but, to avoid the difficulties of the inter-state commerce laws, we provided that in case they did slip through, when they get inside we have them to this extent, that they must notify the commissioner and he can get right after the stock.

Prof. Taft: What about Section 6?

Mr. Morrill: It says that a person shall not engage in the business without complying with Sec. 5.

Prof. Hedrick: After a man has had a state or government officer inspect his stock, he can ship it into the state, and I have nothing further to do with the trees?

Mr. Morrill: He can ship them into the state, but he can not offer them for sale until you have passed on them.

Prof. Taft: What about selling the same within the state?

Mr. Graham: After they get a license from our own state and inspection from another state officer they can do business here.

Mr. Morrill: But if our agent discovers that the stock is infested he can stop it anywhere.

Mr. Kellogg: There is no question about that.

Mr. Morrill: And I am not sure but by a strict interpretation of Section 5, in comparison with Sec. 6, or taking them collectively, they can not ship it into the state; that is, we can seize it without inspection.

CLOVER CROPS.

BY PROF. W. W. TRACY OF DETROIT.

When I proposed to talk about cover crops I thought I had a very easy thing. I was going right to the station record and get all the information I needed from those various bulletins which were available, and I was coming here to do a big thing on somebody's else thunder; but I had only just commenced on that work when I got so deep into the water, so utterly lost, and so uncertain as to where I was in any respect, that I felt in regard to getting assistance from those people of the experiment station something like the old farmer did in Vermont who had a pair of young steers that he wanted to break. One of them was comparatively quiet and docile, but the other seemed to be mortally afraid of the yoke, and he could not possibly get him to go along in it. He got the yoke on one steer, but he could not get the other steer to put his head in. So, being a man, he thought he could help the poor critter out by giving it an idea of what he wanted done. He put his own head in and turned to the steer and tried to call his attention. Well, the quiet steer took offense at this, and started down the hill, and the old man sung out to his son as they were going at a terrific gait, "Land sakes! stop us! we are running away!" When they got to the bottom of the hill and his folk came and began to rub arnica on him, he remarked to his son, "Well, that steer hadn't made three jumps before I knew that I had made a very great mistake." That is about the condition I was in regarding this question of cover crops when I went to the experiment station bulletins. I realized that as for pulling with them I was "not in it." But all the same, my friends, I believe the time is coming, and coming soon, when practical experience and theoretical examination will pull together, and will take you off from the bare ground which has made such hard sledding, and which I believe is the cause of such hard sledding for many of our horticulturists.

Cultivation has for its purpose the conserving, the development, of the fertility of the soil, and its consequent productiveness. We cultivate in order to develop and to conserve and bring out the fertility of the soil on which we are operating. It comes out here every now and then—Mr. Graham spoke of one orchard, and when he wanted specially to impress it upon us that that orchard was in good condition, he said it was new land. Almost any farmer in this state, if he had a choice between some old land and some that was fresh from the forest, would prefer the new land, or comparatively new land, on which to sow his crops. We go out on the prairies of the west and find that people went there years ago, when the prairie had been covered with grass hundreds of years and had not been under cultivation at all, and they got amazing crops. So rich, so fertile, were those lands that they thought they would never need any fertilizing, that there was no need of anything being done in that respect, but they began to cultivate grain and other products, and in a few years they found their soil was being exhausted; that is, the cultivating of the land, instead of enhancing its fertility, was gradually exhausting it. Is there not a little misnomer in regard to our understanding of that? If we cultivate for the sake of enhancing the fertility of our soil, how is it the cultivated fields are constantly decreasing in this very fertility, until finally they become unprofitable for us to work? Is not that true all over?

Take another case. You remember thirty years ago, perhaps, you went to some location and you had a "raising" and built two barns. In the corner of these two barns, where they came together, you remember there was a place where they had thrown out dirt from the basement. It was bare and barren, that little corner between the two barns, an unproductive piece of ground. Now, there are some uses that such corners are usually put to that might account for their increasing fertility, but assume a case where that is not so, and we find that that has been occupied by grasses, first by summer grasses and then burdocks have grown in, and it has not been cultivated; but year after year that soil has been covered, and today, if your wife wants to get some soil to put in her flower-pots, or if you want a little soil that is ideal in its character, you go to that point between the barns, on a piece of land that has been cultivated less than any part of your garden. I call to mind that in Detroit there is a little space on Farnsworth street between the fence and a building. It is a little space that is annually covered until late in the season with all sorts of weeds, there is a great mass of weeds covering it completely. If I wanted to get some soil, a small quantity, to put in a pot, I would go there, where it has not had any cultivation.

Why is it? It seems to me that there must be some point here that we miss. Why is it that a covering of one piece of ground with crops and cultivating it, conserving its fertility, leaving a parallel piece or a part of the same block in forest, that the forest grows richer and richer and richer, and the other poorer and poorer and poorer? What is the difference between a piece of ground covered and shaded, as it is in our large orchards, by apple trees, and a corresponding piece of ground right across the fence, on the other side of the fence, in forest, one growing better and the other growing poorer? It seems to me that somebody will suggest quickly, "Why, the proposition is that in cultivating the ground you are constantly taking from the soil the essential nitrogen, the potash, the ammonia and phosphorus, that you are exhausting the soil by what you are taking off." Prof. Wylie says that the estimated amount of potash per acre in ordinary soil, to the depth of a foot, is 69,000 pounds; that the average farm crop removes from an acre annually close to 47 pounds of potash. Other authorities make it 51 pounds of potash annually. Forty-seven was the amount Mr. Wylie gave, I believe, for a crop of wheat. I assume that ordinarily we have only about 50 pounds for an ordinary average crop, of potash removed by each annual crop, and with 69,000 pounds in an acre we can keep on year after year, taking off crop after crop, without making any material exhaustion in the potash content of the soil. By that time the farmer will be dead, and we will all be happy anyway, and we will not care. The idea that we simply exhaust the soil by taking out these materials, it seems to me, is easily blown away, and its weight is lost when we take into cognizance the enormous quantity of all these valuable matters which analysis says exists there. In California they have some lands which are practically barren, that produce nothing, and yet their state chemist announces that they are richer in potash and phosphorus, and even in nitrogen, than some of the most fertile lands in our country. That is by chemical analysis. The point in which our soils lose in fertility, as we crop them year after year, is in the available material. We may have all these materials, potash, etc. (I will take that alone, I will not go through with the others), but if it is not available in such form that the plant can use it, why, it is of little help to a crop you may wish to take off from the land. The actual soil content of potash is not the question, but, how much of that potash is available and may be brought into the economy of the plant? Now, in this respect, it seems to me we need but very little examination to show this. When this soil, this material, is available, it is soluble; it has to be made soluble, and it is only by means of water that it is brought into the circulation of the plant, and each year it is but a very small proportion of the potash of the soil. I am confining myself to one element now. Suppose that with ordinary conditions we develop about so much potash each year, and it comes into that available condition through various processes, and we take that out every year. Are we not practically shutting ourselves off from our supply?

I pass acre after acre where all sorts of crops have been grown, or go into many of our orchards and find since August, or since cultivation has stopped, that the ground has been exposed—a perfectly bare piece of ground, exposed to the beating rains that have occurred, exposed to all the frosts which are occurring now and will occur until next spring, and to all the melting snows. Is it possible that any soluble material in that soil will not be largely out before vegetation starts next spring? Is it not as plain as can be that if we have a bare piece of ground which has received all the fall and winter rains, all the disintegration of winter frosts, that a large portion of the available material is washed out? It seems to me that this is very true; and taking that thought it looks as though the reason why our forests grow richer and our orchards grow poorer, why our prairies grow richer while our cultivated fields grow poorer, lies simply in the exposure of these lands to the drenching fall and winter rains and spring rains before vegetation can make use of it. How does nature provide for this? You can not go into a forest anywhere in this state but you find an undergrowth (in nearly every forest), which is as thick as any ordinary farm crop. It covers the ground, shades it; and furthermore, if not that, it has a covering of leaves which answers the same purpose. Go out on the prairies and you find the land is covered, in its natural condition, with grasses or weeds, whatever it may happen to be, with vegetation which holds the rain. It not only holds the rain, but it has put, during the fall and winter, a great share of that which might otherwise have washed away, into its roots and in the vegetable matter which is stored away there. It holds the water mechanically, preventing its washing away. In this case I have mentioned, of the corner in the barnyard, the richness of the soil resulted simply because the ground was always covered. It is clear to me that it is the keeping of that covered, and preventing the rains from beating down and washing away the elements of fertility that makes the increased richness.

A most remarkable instance of this condition was shown me when I was in Mississippi. They have what they call "old fields" there, and in many cases such fields are smooth and perfectly barren. The water washes from the hills and slight elevations down into the valleys, and the degree to which that ground is barren of any verdure of any kind is something astonishing. It is perfectly worthless. I saw one farm particularly, which I was told had at one time received a premium as the most fertile farm in the state. It had produced an enormous crop of cotton. That was a great many years ago. Today it looks as barren as any land I have seen. There is nothing growing on it, it simply looks like a pile of clay. Neglect goes on—the water has been allowed to fall upon it in such a way as to wash out all its available nitrogen and potash, and that has been continued year after year until the land is barren. Yet, years ago, it was the most fertile land in all that country.

It seems to me that the suggestion of this instance is just this. That in an orchard or field of any crop, the moment we have got through that cultivation of the soil which is necessary to secure the quick, early growth in the spring which is essential to the highest development of any vegetable—from the moment we pass that time we should immediately do something which will keep the land under cover until the next spring. It seems to me it is just as wasteful for a man to leave a farm exposed without any covering or any protection from the winter and the rains as it is to leave his manure pile in the same condition, and I think he suffers in one case in exactly the same way that he does in the other.

I came here to make a plea for the reasonableness and desirability of cover crops. Is it practicable to do this? We have found that it is so. My plea is not so much—is not entirely, at any rate—for a crop which will gather and increase the plant food in the soil, as it is for a mechanical covering of the soil preventing the ill effects of driving rains, and so I do not adhere so tenaciously to a nitrogen-gathering plant, like clover, as desirable; but the plant above all others, if we could grow it here, which would be desirable for this purpose, is crimson clover. I have found that mammoth clover can be profitably sown in nearly all of our crops. The moment we have finished our cultivation for green crops we sow in all of the fields either clover or rye or peas, or something of that kind, and some of my neighbors have followed the practice. One instance I know of particularly, where a field has been planted in squashes year after year, I think it is for eight or nine successive crops. The moment the last cultivation to that squash field is given, the man immediately sows common mammoth clover, and every year he has succeeded in getting a good crop. By the time he got ready to use the land in the spring he had a considerable growth to plow under. His first work in early spring is to put some manure on the clover, and then he plows it under just before he puts in his squash crop, and he always had a crop of squashes. I think there have been eight successive crops on this field, and they have always done well. I do not approve of that general method of manuring, but I suggest it as an illustration, as it is to me, of the value of a cover crop. We do not confine ourselves to clover. We sow corn frequently, we sow rye, we sow peas, we sow practically anything we have, and it seems to me, in my experience, that we have had better results from using a diversity of cover crops—that is, not using one thing, but some years clover and some years corn, etc. Now, I use sowed corn as a cover crop. That may seem foolish. When out at our farm at Pontiac, in the middle of November, I found sowed corn plants which were still living. The tops were killed away down nearly to the roots, but I took some of those plants out and put them in the greenhouse, and found that they started. They hold the sun and rain, and they serve this mechanical purpose of a cover crop. I think sowed corn is at times very desirable for this purpose; rye is also desirable, and other crops we use very largely are turnips and kale, and always with good results.

I think there is danger in this cover crop which needs to be referred to. The advantage is not in plowing under a great mass of green material; that may be injurious in some cases. We did a good deal of injury to our land by plowing under a too heavy growth of rye. We had to put a chain on to plow it under, and outside of the mechanical disadvantage it was a detriment through a sort of souring that it seemed to go through, and our plants did not appear to grow well until the next year. If we can put on this cover crop the moment we stop cultivation, and get even a short crop (I am satisfied if my clover is only five or six inches high) we feel that we have accomplished a great deal for the benefit of the land.

Our President has spoken to you of the enormous growth he gets on his peach trees, and has referred to the advantage, as I understand it, which comes through that system, in the enlarged trunks and the stouter branches which are developed; and the question came up in my mind, whether the growing of a plant in such a way that we have to cut away and remove as much material every year as we leave on, is a normal and a healthy condition of things in that plant. The President spoke of one case where in one year (I believe it was this) his trees had made a shorter growth, they did not replace the length of wood that he had cut away in the spring, but they were in excellent condition, and probably were going to produce a large crop of fruit. The suggestion comes to me whether there is not in our orchards a possibility of stopping our cultivation a little earlier and putting in a little more promptly these cover crops, which would serve to check this growth we have referred to—this enormous growth—and ripen up a little smaller, a little shorter, a little harder, and a little more healthy. I say "healthy" in the same sense that I say a boy or a man who has grown up normally is a healthier specimen than your athlete who is under special training all the time. We find that the athlete is not long-lived, although he has high physical development; and so in the same way it seems to me that the extreme of Mr. Morrill's system is to develop an athletic peach tree which is not likely to be long-lived. I simply throw this out as a suggestion. The main point I wish to leave with you, and the thing I wish to impress upon you, is the contention on my part that one of the great essentials to successful cultivation, either of farm or of orchard crops, is the prevention, by means of cover crops, of the waste of fertility which is developed during the year by subjecting the bare ground to the fall, winter, and spring rains.

DISCUSSION.

Q: Have you any other crops to suggest than those you have mentioned for that purpose?

Prof. Tracy: The only crops we have suggested are the two clovers (we have used crimson clover), corn, kale, rape, and rye. These are the ones with which I am familiar. We have used turnips.

Mr. Morrill: They would be grown during the fall months.

Mr. Kellogg: President Morrill explained that leaf-curl had something to do with the measure of growth in peach trees.

Prof. Tracy: I know, in this case.

Mr. Kellogg: The general development of the tree was all right.

Prof. Tracy: I am not criticizing that. I am only bringing up the question of whether putting our trees under such high pressure is conducive to long life.

Mr. Kellogg: There is one thing to which Mr. Tracy has called attention, to which I wish to give a little emphasis. I last year had the most magnificent growth of cow-peas I ever saw. We began plowing in August. We took the team off a few weeks and did not plow any more until the peas were all killed by frost, and I got great results. I sowed fifty-five acres of cow-peas this fall, but on account of the excessive drouth (we could not irrigate there) they did not make a large growth. I plowed them under very shallow, thinking perhaps the manure we were to apply would stay on top better; but my cow-peas, where they are heavy, will always stay until spring. It is the humus I am after in cow-peas, as well as nitrogen. I get the seed from the south.

Prof. Tracy: I forgot to mention peas in my list of plants. I have never used cow-peas, but we do use common peas. As to the variety, we simply use any seed which we have left over.

Prof. Beal: When we get seeds from the south, the names are very unreliable; we are likely to get almost anything. I find they are very variable, and this year, at the Agricultural college, those covering the ground made a good growth and fruited freely. A few years ago I had some early sort, the name I am now unable to tell, which seeded still more abundantly. I think we will have no trouble in raising cow-peas that will mature seeds in many parts of Michigan.

Mr. Morrill: I would like to ask if we can quit cultivation in a peach orchard as late as the 15th of August, and get any growth of consequence out of these same cow-peas?

Mr. Kellogg: Not very well.

Prof. Beal: They do not stand frost very well.

Mr. Fifield: We had an illustration last year of using oats as a cover crop, and it worked so nicely on our land that I will give it to you. A part of our soil is quite heavy, and we have a plum orchard of between seven and eight thousand trees on this heavy soil, as well as our peach orchards running from the heavy soil up over the highlands on light soil, and we sowed oats among these trees for a cover crop and they did well.

Mr. Morrill: About what time did you sow?

Mr. Fifield: About the 1st of September. In the winter, I think it was toward the latter part of January, I was over the farm, and in places where the snow had blown off a little, over the ridges and in other places, by digging down we could get some of the oats, and I took some back to the office—green heads of oats, showing the condition they were in there in midwinter. This summer, in cultivating the orchards, we found that the land which heretofore had been hard to work, that was always lumpy and hard (stiff, heavy land), worked as mealy and as nice and smooth as other land that was lighter, showing that the cover crop had helped it in the matter of cultivation; and we could see the change easily by working in adjoining fields where we had not sown the oats. It was the same kind of soil, just as good heretofore as this soil where we had sown the oats, and yet among the trees it was mealy and nice, would not lump up as it did in the adjoining fields.

Mr. Kellogg: I have done that in blackberries, and I believe it is one of the grandest things I ever did. When you cultivate the last time, about the 1st of August, sow your oats, and they will come up just as you say, and it will make a big mat and lie there, and be rotten enough the next spring so that a cultivator will go right through and mix it all up. It is specially valuable in blackberries. It seems to take the food away from the blackberry just enough so that in case you have a little wet weather in the fall the consequent growth is prevented in a measure, I think, by covering the ground. You get that humus right on top of the soil, and get the ground soft and mellow, and the water can not rise through it. Some people do not take stock in capillary action, but I know that the water will go to that loose stuff and it can not go up any higher. In my raspberries and blackberries and everything of that sort I would sow oats. I would use oats preferably to anything else.

Mr. Fifield: I omitted to state that our soil was in such nice condition this spring that we, in some of the orchards, simply put on our disc harrow and it worked the orchard up in nice condition.

Prof. Hedrick: In the west, in Oregon, they use the wild mustard very largely as a cover crop.

Prof. Beal: The common black mustard, is it?

Prof. Hedrick: Yes, sir. It began to be known because it is a great pest in some parts of the state. They find that the mustard stands in the orchard over winter, and they plow it under.

Prof. Beal: White mustard is sometimes used. Was that used?

Prof. Hedrick: I do not think it was.

Prof. Tracy: Mr. Graham was speaking of an orchard at Grand Rapids which had never been taken care of, but which succeeded this year. From his description I should imagine that the orchard had a cover crop on it. The cover crop may be weeds—all right. I am not advocating shiftless cultivation, mind, but if that orchard had been cultivated early in the season, so as to get that growth, to get the trees ahead in order to make the size of the fruit, I should believe its uniform healthfulness and uniform productiveness had been largely due to the cover crop which has always been on it.

Mr. Morrill: I wish to say just a word in regard to Professor Tracy's—not criticism, but suggestion, in regard to growing peach trees, and to remind him that but a day or two ago he told us that the reason the greatest perfection was obtained at the northern limit of successful production was on account of the rapid growth and maturity of any plant or vegetable, and I am quite firmly of the faith that that applies to a peach tree just as well as it does to anything else. I do not know that I am trying to grow peach trees to outlive me. I seek the greatest benefit in the least possible time of those trees while I am here to enjoy it. We know this, that in order to get a large crop of any particular fruit you have first to have area, and we must have growth as quickly as possible, providing the growth is sound. Now, the fact that the wood in these strong growths is sound is evident to me, when I find my terminal buds are matured so early as in this particular season of which we are talking, the last of September and the 1st of October, without a frost, the foliage all ripe and ready to drop off, without the slightest discoloration and the wood as hard and white clear through as hickory. So far as the life of the tree is concerned, I can not tell anything about that. I have ten-year-old trees as sound as a dollar. When we have occasion to cut off a limb of four or five years' growth, we find it white and sound to the heart, and I find that other trees, grown by the slower methods, without trimming back, are almost invariably yellow in the center wood. Soundness is further evidenced by the fact that even those old trees, bearing heavy crops, still continue to make great terminal growths. I believe that is evidence enough—the method is good enough for me, at least.

Prof. Tracy: Well, I spoke of that to bring out the idea that in a great many orchards that is not so.

Mr. Morrill: It has no reference to cover crops.

Prof. Tracy: And yet, in a great many instances, would not the habitual use of cover crops prevent a late growth which is often injurious?

Mr. Morrill: Yes. As a cover crop for that orchard I sowed oats this year in August, the minute we quit cultivation; sowed it with oats because they would be dead in the spring, bringing to it the same condition as that of which Mr. Fifield speaks. They have protected it from deep freezing, and saved humus. I believe it is one of the cheapest methods today for restoring fertility to our soil, and perhaps the only way available for many people. I believe the sooner we recognize it the sooner we will get money out of the soil.

Mr. Slayton: Do you use oats in the peach orchard as a cover crop? A: Yes, sir.

Mr. Slayton: Plow them under early in the spring? A: Yes, sir.

Mr. Morrill: I agree with Mr. Kellogg, or he agrees with me, as you please, that mammoth clover does more good if allowed to lie on the ground and then turned under, than it would if turned under green. I have injured land by doing that, or at least put it in a condition that it would not produce a good crop for a year or two. I had the clover just as thick as it would stand, and put it under green, and it would not produce anything for a year; but by letting it dry, and going over it with a disc harrow and turning it under, I got good results. I am not much in favor of green-manuring. It should be handled cautiously at least.

Prof. Tracy: In ordinary years is there not a time, early in the spring, in most lands, when there is a super-abundance of water? Any plant which will take that out is an advantage rather than a disadvantage. Will not a cover crop, for instance clover or oats or rye, answer that purpose? I think no greater mistake can be made than to let a cover crop remain too long. We did immeasurable damage to our farm at Pontiac by letting our rye grow too big, and ninety-nine people out of a hundred, when they try it, will do that—will let the cover crop stand too long. It should be turned under just as soon as the ground is fit to plow.

Mr. Kellogg: I had more special reference to blackberries. If you have a cover crop on in the spring, and it grows a few inches, it appropriates the food available for the blackberry or raspberry; and when the plant starts it does not get it. It is true, when it is turned under it becomes immediately available again. I apprehend that the green stuff soon decays and the plant food would be available.

Mr. Morrill: The suggestion of Prof. Tracy brings out a fact that may have been overlooked. He may figure from one premise and I from another. He has spoken of the advantage of a cover crop taking out surplus moisture. The only thing I had in mind was my own place, which does not need that. It is dry, sandy land, and two or three days after the frost is out I can cultivate. In clay soil that would be a decided advantage, while with me it would be a disadvantage. These are things each must decide for himself.

DISEASES OF THE APPLE.

BY DR. W. J. BEAL, MICHIGAN AGRICULTURAL COLLEGE.

In a certain sense an apple tree may be said to be diseased if it fails to thrive in consequence of a soil which is too wet or too dry or too thin, or where the roots are struggling amid a close sod of grasses or clovers, or any kind of sown grain. It may be struggling almost between life and death because of damage inflicted in winter by severe cold, or it may be almost bored to death by beetles in the trunk, or the young branches may be nearly smothered by bark-lice. The leaves and the fruit may be damaged by the scab, or the twigs and leaves blighted by a microbe. I suppose I am expected to speak of diseases caused by fungi.

I hardly need to tell people in this audience who read bulletins of experiment stations and horticultural reports, that a fungus is a plant as much as the tree or shrub that it thrives upon. A tree is produced by a seed, the fungus by a minute spore. The tree or any other plant fed upon by a fungus, is known as the host plant.

You have all heard of the Western New York Horticultural society as one of the largest and most famous in the world. In October, 1895, they appointed a committee on plant diseases, and this committee put out a circular to gather information concerning plant diseases. In this circular only three diseases of the apple were enumerated, viz.: First, pear-blight or fire-blight or twig-blight; second, scab; third, powdery mildew.

Really, over two hundred kinds of fungi have at one time or another been found to attack the apple tree, its leaves, flowers, or fruits.

I remember somewhere to have seen a representation of a large apple with the surface on one side marked off into little blocks or fields, assigning a separate area to a single fungus. No apple could furnish room enough for a twentieth part of the kinds of fungi which somewhere or at some time have been found on the fruit.

To me this is a most fascinating subject, but the details are so small that I do not flatter myself I shall arouse much enthusiasm at this time, with a talk on fungi. I will be brief, show you a few pictures, and skirmish lightly around the edges of the field, hoping to arouse the curiosity of some of the youngest persons here present.

I have on the table a few plates of apples that some of you may think hardly worth premiums, but I hope they will yet prove instructive. It is rather difficult, I may say very difficult, to collect specimens that are infested in a conspicuous manner by a single fungus only. In these cases before you, I have been reasonably successful. The study is not a very easy one, I find, even for the most advanced students in the senior class at the Agricultural college. There are many difficulties to be overcome in securing good specimens and in preparing good sections, that they may be clear enough to serve the artist as models for study and drawing. I hardly need speak at length concerning the illustrations.

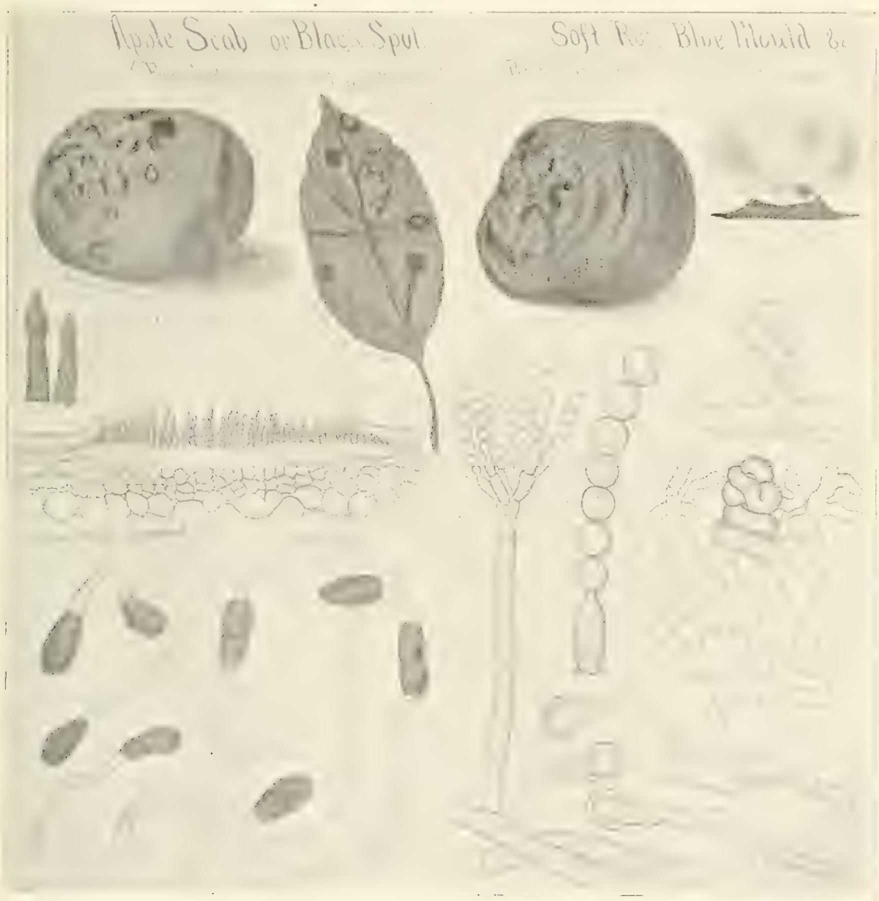
Apple Scab or Black Spot.
Soft Rot Blue Mould &c

PLATE 1.

1. Apple affected with scab.
2. Leaf of apple affected with scab.
3. Section of apple through affected spot.
4. Two short stems bearing spores.
5. Spores germinating.
6. Apple affected with soft rot—blue mould.
7. Tuft of mould from apple.
8. Stem of mould bearing branches that contain spores.
9. Spores germinating.
10. Two threads from growth twisting about each other.
11. Still later with more jointed threads beginning to form perithecium.

Apple scab or black-spot (*Fusicladium dentriticum* [Wallr.] Eckl.) is the worst all-round thief that worries the apple tree and its fruit. It is found all over the world where apples are grown, but is specially prominent in cool, temperate regions.

It appears early in the growing season, causing olive-brown spots on the leaves, which are sometimes nearly destroyed by the attacks. On the fruit the dark spots, when young, are rounded more or less, and the margins are white, caused by the uprising of the epidermis. An illustration through a spot on the apple is here shown much enlarged. The scab is only skin deep, so to speak, but as it progresses some of the outer cells of the fruit are destroyed. As it spreads the center of the spot becomes thicker and often cracks open, permitting other fungi to get a foot-hold and cause decay.

Here in the section are shown some brown stems bearing spores at the top, and the spores are represented below as germinating, some two-celled, but mostly one-celled. Ripe spores will grow in dew or water in a few hours and will pierce the cuticle of the fruit and start a spot of the scab.

These spores may live over winter on fallen leaves or fruit, and some of them, at least, I have found on the young stems and bud scales at any time from summer to the next spring. These are ready for a renewal of business on the approaching young leaves and young apples, even before blossoming.

The scab is not the immediate cause of rot in apples. When started early it causes the apple to cease growing in the region of the spots, or at least to grow slower than the parts unaffected. A fungus that feeds on a living host is known as a parasite. For treatment, I refer to bulletins from the horticultural department, and this suggestion refers to most of the other fungi spoken of.

In the laboratory, we prepare pieces of the apple or leaf by hardening in strong alcohol, embedding in collodion, and then cutting thin sections with a delicate machine called a microtome. A few fresh spores are taken from a spot, placed in a small, flat drop of water on a thin piece of glass, and then turned over and placed on a glass cemented tight with asphalt and vaseline. Here we have a hanging drop over an air-tight, moist chamber. From time to time the preparation may be placed under the microscope so the student can see how things are progressing. Fresh young fruit is inoculated and kept under a bell-jar, where the symptoms can be observed. It is nice, interesting work for the inquiring student, who has a good stock of mechanical skill, not omitting to mention patience and perseverence.

Soft-rot, blue mould (*Penicillium glaucum* Link.), feeds on a great variety of substances, among them mature apples, not on the green leaves or growing fruit. Such a fungus is known as a saprophyte and not a parasite. Where is the fruitgrower of any experience who has not carried from his warm cellar in winter or spring bushels and barrels of soft apples, all in the form of a worthless mush? Here soft-rot had got in its work. It is a low form of plant, whose minute spores are almost omnipresent. These spores, when growing, apparently can not penetrate the skin of a sound apple, but are ready to drop into any worm-hole or crack or defect caused by a break in the skin originating from a bruise or a punch of a straw of the stubble. In ripe fruit this fungus runs its course in a hurry. After the white threads run through and through, feeding on the apple, the fungus, true to its nature, pushes out large numbers of minute, delicate threads, which branch at the tip, and these branches finally become spores, and when seen in mass have a bluish-green color. A newly infested spot may produce spores in two weeks or less, and then be ready to carry on its work of destruction to new fields. These rots and moulds are great agents in reducing living or dead products and in fitting materials to be used in nourishing growing plants.

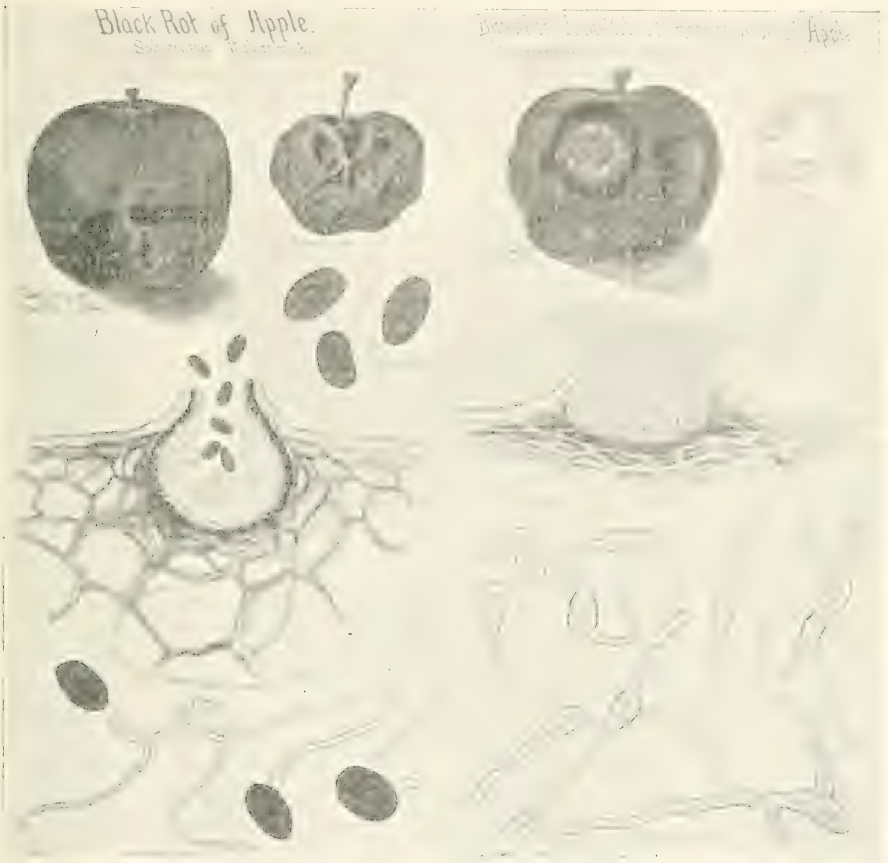

Plate II.

1. Early stage of black-rot on apple.
2. Apple thoroughly affected and dried.
3. Portion of diseased apple showing a perithecium in section.
4. Mature spores.
5. Spores germinating.
6. Apple affected with bitter-rot.
7. Section through a pustule.
8. Short stems bearing spores.
9. Mature spores.
10. Spores in variety germinating.

Were there no moulds, rots, nor microbes, nothing would decay, and we should have a world full of mummies of all sorts, tumbling around under foot, utterly worthless. How much better to have them rot and be reduced, and let other plants use the previous materials over again. In rare instances this soft-rot produces another kind of spore of a more hardy nature, destined to carry the species over long spells of unfavorable weather.

Black-rot (*Sphæropsis Malorum* Berk.) has been rather common at the Agricultural college several years past. Ripe apples, when first attacked, look much as though affected with soft-rot, but the progress is slower, and the fruit is harder and keeps its shape very well a considerable time. It finally becomes dark and then black, on account of the color of the fungus in the apple, and shrinks away into a mummy, with many folds or wrinkles on the surface. If the process is not hurried along too rapidly these wrinkles will abound in little pimples which discharge some little specks. Here is shown a ruptured spot (perithecium) in which are some short stems bearing each a rather large, brown, oval spore, and near by these are shown, in a growing state, now ready to enter a ripe apple. These mummy fruits of apples or crab-apples, if not disturbed, often hang on the tree a year or more, holding some of their spores for distribution when the weather is favorable.

Bitter-rot, ripe-rot, or anthracnose (*Glœosporium fructigenum* Berk., G. versicolor B. & C.) in some form or other is quite common. Apples like Baldwins are often seen to have numerous small, round, tough, sunken spots just beneath the skin, and in most cases these are very bitter. The bitter-rot of the Baldwin above referred to is apparently *not* the one further noticed below. I have not found this fungus in good fruiting condition at the college till last year, and then only on some Pennocks. Perhaps it is more likely to be confounded with black-rot than anything else. In this comparison the spots are circular until two or more are blended together. They are brown but never black. The pustules, perithecia or pycnidia usually appear radiating about a center, making a ring one fourth to half an inch in diameter. From the jointed stems in a pustule appear small oval spores of a light color and not large nor of brown color. The germinating spores of the two are quite unlike each other, as seen by looking at these drawings.

The spot disease of the Baldwin apple, often called bitter-rot (Dothidia pomigena Schul.), besides being common on Baldwin appears on Pennock and some other sorts as sunken brown spots from the size of a pinhead to that of a pea, or even larger. The spots are tough, brown, and bitter. Several protracted efforts to mature the fungus to a fruiting condition have failed in the laboratory at the college, but Prof. L. R. Jones of Vermont, in his report of the experiment station for 1891, says he partially succeeded in maturing the spores by placing apples in a moist chamber, and that J. B. Ellis of New Jersey identified the fungus as being probably the one named above.

Apple-leaf rust (*Gymnosporangium macropus* Link.) (*Ræstelia pyrata* Thaxter). The life history of this parasite reads like a fairy tale, and when heard for the first time almost every one shakes his head with incredulity, notwithstanding the truth has been again and again demonstrated beyond question. In May or June the leaves of the apple, when affected by this fungus, are more or less spotted with orange-yellow, and after a few weeks those places on the leaves are three times their normal thickness. In these spots are numerous deep cluster-cups with spreading margins, and in the cups spores are produced which escape, but when germinating they can not be induced to grow into the leaves of the apple.

They will, however, grow readily into the young twigs of red cedar, and these produce what finally develop into cedar-apples. These curved, orange-colored arms consist of clusters of slender, flexible stems, each of which bears a two-celled or double spore. On some wet day these germinate in a few hours and produce little arms, on the ends of which are borne very small secondary spores or sporidia, and these may be carried by wind to neighboring apple trees, where they germinate and enter the tender leaves to start colonies of cluster-cups. After shedding

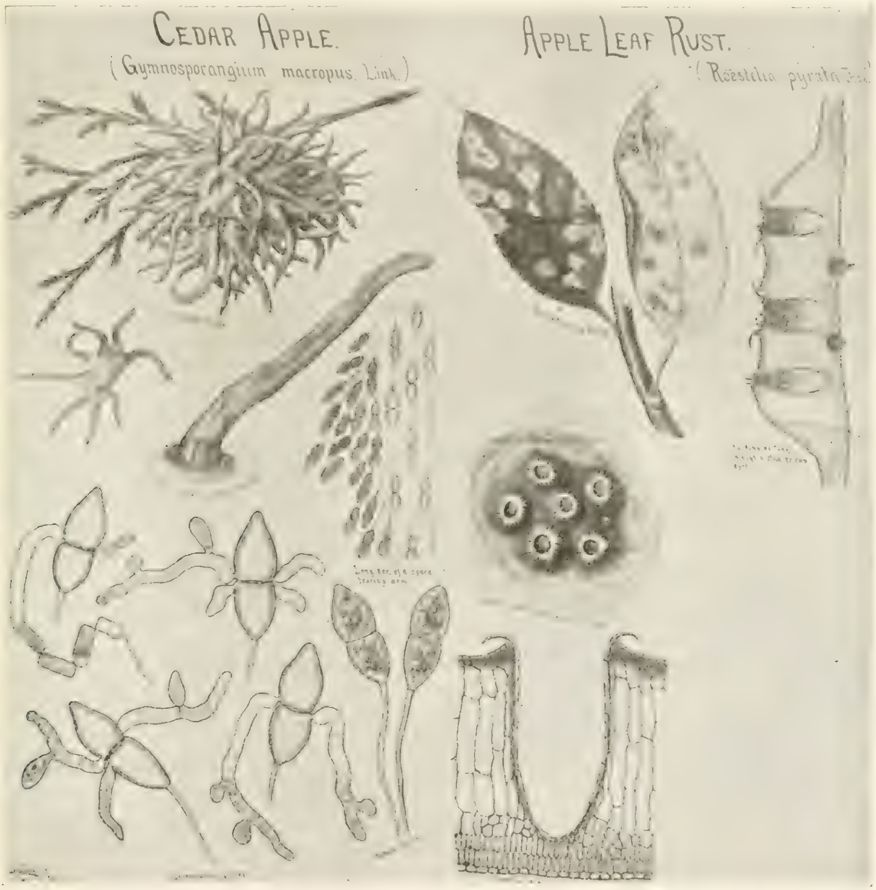

PLATE III.

1. A large and small cedar-apple in May, as swollen when wet, often two inches in diameter.
2. One arm of cedar-apple much enlarged.
3. Portion of a section of arm, highly magnified, showing two-celled spores.
4. Two spores more highly magnified, and at the left several spores germinating and producing sporidia which are ready to grow and produce rust on leaves of apple trees.
5. Leaves of apples affected by rust caught from cedar apples.
6. Six of the cluster-cups as seen on the lower sides of the leaves of an apple.
7. A section of an affected leaf of an apple tree, much thickened in the region of some cluster-cups.
8. Section of empty cluster-cup very much enlarged.

the spores these fleshy, orange-colored arms fall off, but the central ball which supported them usually remains alive and makes further growth during the summer, and the next spring is ready to put forth a new set of arms that bear the spores. This fungus has two hosts or two dwellings. It lives on the cedar in winter and early spring (and in fact the year round), and a form lives on the leaves of the apple from spring to summer. For a long time no botanist mistrusted this condition of things, and the fungus on the apple received one name and the fungus on the red cedar another name.

Powdery mildew of the cherry and apple (*Podosphæra oxycanthæ* [D. C.] D. By.) This fungus thrives on young growth, the tender branches and leaves, and troubles nursery stock more than older trees in the orchard. The mildew is found on the surface of the parts affected, giving them a white color. It is a shallow feeder, gathering food by use of little bunchy suckers pushed into the outer cells, known as the epidermis of the plant. The conidia or summer spores are white and delicate, and produced by erect stems from the mildew. All these are expected to perish at the close of the growing season; but the mildew is not to be frozen out by death to its summer spores, for it produces another sort which are well clothed with thick coat and overcoat, well padded and lined.

This brown spherical body (perithecium) with its numerous arms, each terminating in a queer-shaped, branching appendage which anchors the thing to the host plant, contains a light-colored sack (ascus) here represented, and in the ascus are eight spores snugly packed away to be ready for growing trees in spring. Powdered sulphur is the standard remedy, and ammoniacal carbonate of copper.

Fly-speck (*Leptothyrium Pomi* [Mont. et Fr.] Sacc.) (*Labrella Pom*). There are many low forms of plant life that wander about on the surface of an apple, disfiguring its rosy cheek, especially in moist seasons. Happily the cuticle of an apple is pretty thick and waxy and quite impervious to trifles; but, like hungry wolves, these numerous saprophytes are always lurking about for a chance to slip in at an open door and begin their work of destruction.

Among the little objects occasionally seen on apples are clusters of the one named above, not a very elegant common name, but one that all of us understand. It does not injure the apple much, excepting to destroy its beauty. I have found them on Shiawassee Beauty, and more especially on some small natural fruit grown without much care in the arboretum. This little speck has been very seldom noticed in bulletins and reports.

Twig-blight, fire blight. (*Micrococcus amylovorus* Burrill.) The effects of this parasite are familiar in the black and blasted young growth of stems and leaves, as sometimes seen in summer. The cause is the same as that for pear-blight, a microbe or bacterium, well studied by Dr. T. J. Burrill, Dr. J. C. Arthur, and M. B. Waite. The remedy most practicable seems to be to cut off thoroughly and promptly and burn or bury the parts affected, and see that the same thing is done for all neighboring trees of pear, quince, crab-apple, wild crab, mountain ash, serviceberry, and hawthorn, as they are subject to the same disease. Mr. Waite says avoid the production of much new wood, avoid stimulating with barnyard manures.

But I hear more than one fruitgrower say, I do not care so much for the names and habits of these fungi. All I want to know is how to kill the stuff and get rid of it. I think I have said enough to indicate that the subject is fraught with many difficulties, and that in many cases it is important to know the habits or life history of an enemy before you know how to make an economical and successful attack, and it is often impossible to distinguish one fungus from a number of others in their earlier stages. You will infer that the pomologist and the botanist are not likely soon to be out of employment for the want of something to study and overcome. In this respect we can fall in with the views of our friend,

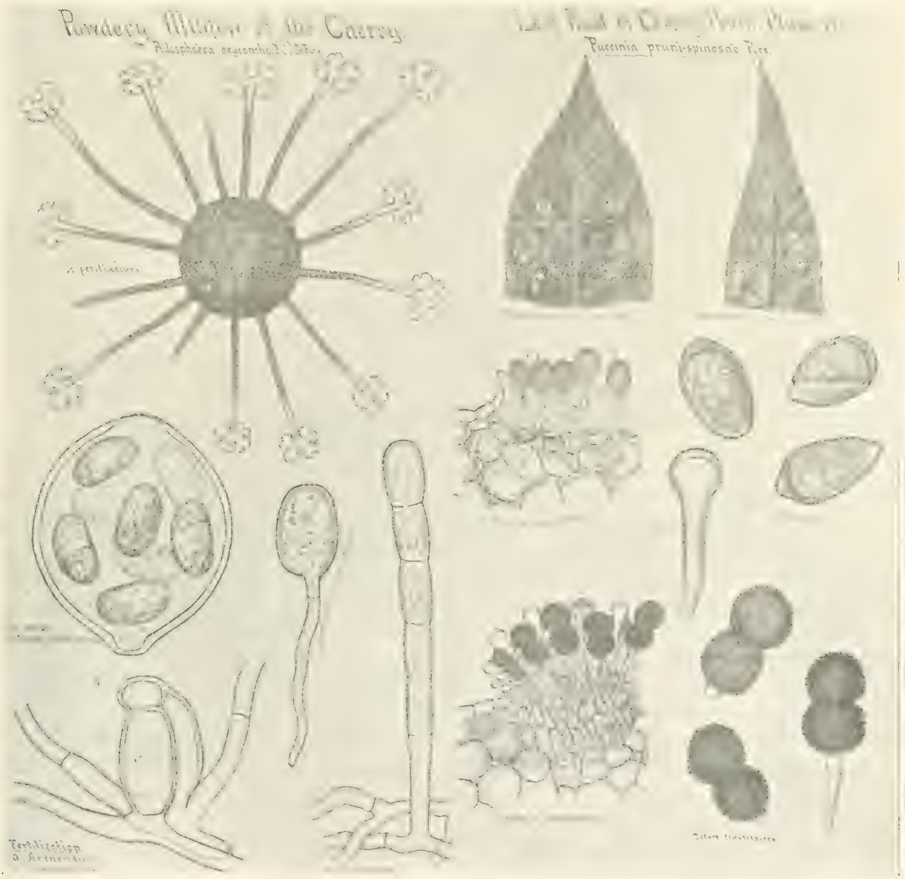
Powdery Mildew of the Cherry.
Podosphaera oxyacanthae (DC.) De By.
Puccinia pruni-spinosae Pers.
Fertilization

PLATE IV.

1. A perithecium with sixteen queer appendages, the whole barely visible to the unaided eye.
2. A single scale (ascus) from number one, containing eight spores.
3. An erect conidispore about to break up into a number of spores.
4. One of these thin-celled spores germinating.
5. Showing the process of fertilization, the contents of one cell about to pass to a larger cell that resting-spores may be produced.
6-12. Leaf-rust of the cherry, peach, plum, etc., but not the apple.

Professor Tracy, who long ago said he was always glad when a new insect enemy appeared, for then he had something more to study and had a chance to gain another victory. Opportunities for new victories are becoming alarmingly frequent as the country becomes older and more thickly inhabited.

DISCUSSION.

Q: Does the cedar-apple grow on any tree except the cedar?

Dr. Beal: No, not that kind.

Q: How far will it injure apple trees, how far from any cedar trees?

Prof. Tracy: A mile and a quarter, of which I knew positively.

Dr. Beal: It depends on the wind and the strength of it, and sometimes possibly it is carried by birds and insects as well. It can not be answered definitely so far as I know.

Q: How do you avoid soft-rot?

Dr. Beal: Have your apples perfectly sound, free from worm holes and cracks, and keep them cool enough.

Q: Why do we have three times as much of the soft-rot this year as we have had before?

Dr. Beal: I think the reason we had more this year than we had last is that apples are wormier than they used to be.

Mr. Morrill: Is it not because there are less apples and more worms?

Dr. Beal: Yes, sir.

Mr. Slayton: Will any kind of spraying or treatment avoid soft-rot or dry-rot?

Dr. Beal: I do not think this soft-rot amounts to anything on the tree at all, while the fruit is on the tree. It appears after the apples are stored in the bin.

Mr. Morrill: We would naturally suppose that a state that produced 13,000,000 bushels of apples in 1891, and has shrunk down to a very small proportion of marketable apples, would begin to wish to know what is the matter, and there are a good many of these things the matter. One great trouble in this country is apple scab. The spraying side of the question has been repeated from year to year by the professor of the experiment station. His spraying bulletins have been spread broadcast by the thousand over the state, in first, second, and third editions, perhaps, and I presume he has a stock now ready for spring use. I think they have done a great deal of good.

Sec'y Reid: There are some questions here directly upon this line. The first is: Previous to last year, 1896, and also this year, apples were wormy and inferior, but last year they were free from worms, and cropped with the same kind of treatment. What makes this difference—is it the elements?

Dr Beal: Our treasurer has answered that question. He says this year there are not apples enough to go around. Last year there were a good many wormy apples, if we had got at them in the aggregate, and so of the fungi. The stock of insects last year had a good chance and there was a good crop of them left over, and having a short crop of fruit this year, they make a remarkable impression.

Q: Then you think there were just as many insects and fungi this year, but less apples?

Dr. Beal: I fancy next year, if they had been well fought, we should have better crops again.

Mr. Kellogg: I would ask if the apple-scab that affects the fruit is the identical thing that affects the leaves? A: Yes, sir.

Mr. Kellogg: I have always understood so.

Sec'y Reid: Prof. Taft, one wishes to know if there was anything in the elements that effected this result. Is it not a fact that there is considerable in the elements, from one season to another, which promotes or retards the growth of scab?

Prof. Taft: If the trees are checked in their growth, and we have a moist, cold period in the spring, particularly when it comes muggy, damp weather, we are very likely to have scab, and we had those conditions last spring. So far as the injury to the foliage was concerned, it was noticeable throughout the season, and in unsprayed orchards the foliage was a half to two thirds destroyed by apple-scab. Where the trees were sprayed the injuries were greatly reduced, and the trees are in much better condition for the next year's crop than those that were unsprayed, where they lost the leaves, stopping the development of the buds for next season.

Mr. Kellogg: Then I infer that the only safe way is to get out the spraying apparatus. Prof. Taft: That is it.

Dr. Beal: Prof. Taft has touched upon a point we should insist upon here. Most people somehow think the growth of these things depends on the season entirely; that an unfavorable season is going to bring a lot of that stuff on whether there is any of it around or not. I wish to combat that opinion most thoroughly. They will not grow at all unless there are spores. As Prof. Taft says, if the weather is favorable, if there is continuous moisture enough, heavy dews and muggy weather, those are going to develop and get hold of the plants and work most thoroughly; but no fungi will appear unless there are some of those spores surviving. The apple would simply dry up without rotting at all except that there are a lot of those things. You know fruit will keep perpetually in air-tight cans. It would be just so outside if we did not have those various fungi to interfere.

FUNGOUS DISEASES OF THE APPLE AND PEAR.

BY PROF. M. B. WAITE OF WASHINGTON, D. C.

The lecture was given from a series of lantern slide pictures thrown upon a screen, illustrating the various points brought out. It is therefore not possible to reproduce it in printed form. The following paper is an abstract intended to give the principal ideas that were presented:

Pear and apple scab are well known to be destructive to the pear and apple in Michigan. The pear scab is caused by the fungus *Fusicladium pyrinum* and the apple scab is caused by *Fusicladium dentriticum*. They are closely allied, and so nearly the same in their general effects on the host plant and in their treatment, that they may be considered together. The fungus causes rusty, brown, and scabby spots on the fruit and produces a dull, rusty, sickly foliage. Infection by this fungus takes place very early in the spring, commonly when the pears or apples are in bud. The disease is very susceptible to the effects of weather. Infection takes place to a dangerous extent only during moist, rainy weather. Dry, sunny weather is so unfavorable to the disease that if such weather continues through the budding and blooming period there will usually not be enough scab to be worth while spraying for. The fungus spores live through the winter on the fallen leaves and fruit, and possibly to some extent on the twigs, and are ready to begin operations as soon as the buds burst in the spring. The pear and apple blossoms, as you doubtless well know, are borne in clusters of six to eight flowers, and each cluster is contained in a single bud.

As soon as the cluster buds open in the spring, exposing the individual flower buds, the first spraying with Bordeaux mixture should be made. When the flower buds have grown until they are just ready to open, showing the white or pink color of the flowers, the second treatment should be made. The length of time between these two treatments will depend upon the weather, but normally should be about a week. The second spraying should be made barely in advance of the bloom. Occasionally a blossom may be open during this second spraying. Nothing is to be done while the trees are in blossom, but as soon as the bloom is shed a third spraying should be given. Up to this time the treatment has been mainly in the nature of an insurance of the crop. The spray is applied ahead of the supposed infections. If the buds, blossoms, and young fruits are fairly well coated with the fungicide, we may be reasonably certain that the greater portion of them will escape unharmed, even if a severe infection period should pass over. The most important work of spraying for apple scab may be considered finished when the third treatment has been made. For the third spraying it is very desirable to add Paris green at the rate of one pound to 200 gallons of the mixture, and spray for the codlin moth and leaf-eating insects at the same time. In other words, Bordeaux mixture may just as well carry an insecticide along with it, so that the two substances are sprayed together. Any further treatment should depend largely on the judgment of the grower.

If thorough work is intended, two more treatments are desirable, especially if rainy weather has been so favorable to the disease that it has been somewhat prevalent in the orchard. The fourth treatment should be made about ten days after the third. This spraying will be of great benefit to the foliage as well as to the fruit, and will go a long way toward protecting it from fungus, and will make the leaves bright and healthy. To insure still more thorough work, from ten to fifteen days later the fifth spraying may be given. These five sprayings, if thoroughly done, should practically annihilate the scab fungus from the foliage so far as one season is concerned, and should result in making 90 to 95 per cent. of the fruit fair and smooth.

Pear-leaf blight, caused by the fungus *Entomosporium maculatum*, produces small, round, brown spots thickly dotted over the foliage of both pear and quince, and somewhat similar spots on the fruit, except they have a red-colored border. The results of the spots on the fruit is a cracking and distortion of the fruit, somewhat similar to that occurring in bad cases of scab. In severe cases this fungus produces a serious physiological disturbance that results in the shedding of the leaves. Defoliation from the attacks of this fungus is its most serious effect. In the middle and southern states, full-grown pear trees are defoliated in midsummer, often by the first week in July. The continued defoliation becomes such a serious drain on the trees that many of the varieties fail to be profitable from this cause. In Michigan and other northern states the defoliation of bearing trees is comparatively rare, but the disease occurs to some extent on them and is particularly injurious to nursery stock, especially to the seedlings in the nursery row, before they are budded, and to the tiny seedlings in the seed bed. On the quince, however, defoliation often occurs, and the "spot" on the fruit of the quince, as the result of the fungus, is often nearly ruinous to the crop. The pear-leaf fungus is quite the opposite of scab fungus in many respects, being favored by hot, dry weather. Probably the spores germinate on the leaves and fruit, in drops of rain or dew, in the same manner as the scab fungus, but the defoliating effect particularly seems to depend on hot weather. The pear leaf-blight fungus is much more susceptible to treatment than the scab fungus, and in fact is one of the easiest of all plant parasites to prevent. On adult trees, two or three other sprayings with Bordeaux mixture, beginning after the trees are in full foliage, and spraying at intervals of about fifteen days, are sufficient to practically annihilate the fungus. In the nursery the disease is somewhat more difficult to prevent, for the reason that new growth continues throughout nearly the whole season, and new foliage is continually being put forth, unprotected by Bordeaux mixture. On this account more spraying is desirable, about five to seven treatments being necessary for thoroughness. In growing pear seedlings, spraying should begin as soon as the seedlings are thoroughly up, and should be continued at intervals of a week to ten days while new leaves are forming. It is very difficult to keep them free from the disease.

Pictures of various types of spraying machinery were shown. The first was a knapsack sprayer, made to carry on a man's back. Another consisted of a strong force-pump mounted in a barrel. This was considered to be one of the best types of machine. Then there is a somewhat elaborate one consisting of a tank on a raised platform, elevating the man who holds the nozzle ten or twelve feet above the ground. Power sprayers were discussed, but as they are made at present they are scarcely commended to general use, although certain men have rigged up machines that are very useful for their work.

Pear blight is so well known in Michigan that it is scarcely necessary to describe it in detail. The disease attacks the pear, apple, peach, quince, crab apple, Siberian crab, and several other related plants belonging to the pome family. The disease is known to be the work of a living parasite, a microbe belonging to the bacteria. The cause of this disease was discovered by Prof. Burrill of Illinois, in 1879, although the disease has been known in this country one hundred years. The pear-blight microbe begins its attack in the spring on the blossoms. It grows in the center of the flower and is able to penetrate the nectaries, and grows down into the blossom and spreads into the fruit spurs and then down into the tree. During the flowering period, if the trees are attacked by blight it spreads with great rapidity from one blossom to another. This rapid spread of the disease is due to the visits of insects. Bees and other insects visiting the pear blossoms for nectar and pollen unwittingly carry the blight germs from flower to flower and from tree to tree. Occasionally birds may carry the disease, and in this way it probably is communicated long distances. After blooming time is over, the disease can still enter the tree through the young green tips of the twigs. It also rarely enters in tender, growing bark, but as a whole the blossom clusters in spring and the tender tips after blooming is over and during summer are the two main methods of infection. Even on the twigs the disease is probably carried by insects and introduced by punctures. In artificial infection it has been found impossible to introduce the disease on the twigs without a puncture of some sort.

The amount of damage done will depend upon a number of factors, such as susceptibility of the variety, amount of moisture, age of the tree, and amount of cultivation and fertilization. Certain varieties like Vicar, Clapp's Favorite, and to a less extent Bartlett and Flemish Beauty, are very susceptibile to the disease. Other varieties, like Angouleme and Kieffer, are much less susceptible. However, it should be noted that this is merely a difference in susceptibility, and in no case amounts to absolute immunity. We have no varieties of pear, apple, and quince which are immune to this disease. All will contract the disease and be blighted with more or less severity. The disease is mainly restricted to the tender, succulent, growing parts of the tree, and on its downward course in the branches it is almost limited to the bark. The inner bark on the tree is of course of this tender, succulent character during the period of growth. The disease progresses very slowly, even on the vigorous young twigs, rarely reaching more than two or three inches in a day, although possibly it may spread twice as fast. Naturally the destruction of the bark and cambium layer on the limb results finally in the killing of the limb, although girdled branches may remain apparently alive a year or more. Under favorable conditions, when the vessels are gorged with sap, the microbes often overflow from the bark into the vessels of the wood. When dry weather comes again the vessels, being clogged or destroyed, are prevented from conducting water to the foliage, and the limb collapses suddenly. Such occurrences have given rise to the popular error that blight may kill a large limb or tree in a single night. In this case the disease may have been in the bark several weeks, and merely spread into the water-conducting tissues at a favorable time and cut off the water supply.

The pear-blight microbe belongs to the class of bacteria, which, as you doubtless know, is the smallest of all living things. These germs are of vegetable nature, composed of simple cells which multiply by splitting in two. They have minute flagella over their surfaces, and can live only in liquids or moist substances. They swarm in immense numbers in the sap of the tree, and force their way into the tree and into the sap of the cell, killing all the tissues which they reach. The disease causes a greater part of its damage in the month or so following the blooming period, or in young orchards and in the nursery it may be severe all through the summer. In the majority of cases, however, the disease has entirely died out by midsummer. At that time the line of separation between the live and the dead wood is clearly marked, and probably not one case in one hundred would be found where the diseased wood blends off into the healthy. In this case, where there is no distinction between the healthy and blighted wood, the disease is still progressing. In all other cases where the disease has stopped, the microbes have all died or disappeared.

This microbe is a very delicate organism, and forms no spores. It is readily killed by drying, and in the blighted twigs it dies out in one or two weeks when exposed to ordinary summer weather. It is easily killed by heat. Even hot dry summer weather very closely approaches its death point if not in some cases reaching it. It stands any amount of cold. If frozen below zero, on thawing out it grows as readily as if nothing had happened. It is very easily killed by poisons and fungicides. However, all attempts to prevent the disease by spraying with such mixtures have proven failures on account of the insidious way in which this parasite grows inside the tissues of the host. The disease dies out so thoroughly in the blighted branches that it was a question for some time just how the microbes live over winter and start the disease the following spring. It was found by examining a great many cases of blight that in certain branches the disease may sometimes keep on growing through summer, advancing very slowly into the new bark. Whenever a case of blight succeeds in pushing onward during the summer time, no matter how slowly, and does not dry out and form a definite line between the diseased and healthy wood, and the disease is continued up to the time the leaves fall, such cases result in the blight holding over winter. The cases of hold-over blight make the vulnerable point in the life history of the pear blight germ. The disease can not hold over in the dead bark.

Extermination of the pear-blight microbe is the only satisfactory treatment of the disease. These cases of hold-over blight start the disease the following spring. The source of supply of the pear-blight virus, as it may be called, is spots of the gummy exudation pushed forth from the branches when new growth starts the following spring. This is in fact the dangerous source of infection. We know that no matter how favorable conditions may be for pear blight, if we have not the supply of the germs at hand there will be no blight. These cases of hold-over blight are the key-note of the question. From them the germs will come for a season's destruction. Every one should be carefully cut out and burned.

Not a single case of active blight should be allowed to survive the winter, not only in the orchard in question but also within a radius of half a mile from it. Every tree of the apple family, including the apple, pear, quince, Siberian crab, and even the hawthorn, should be examined for this purpose. The orchardist should make certain that the very last case had been destroyed, for a few carelessly left will go a long way toward undoing the work. Extermination of the blight may be undertaken any time during the winter, but it can undoubtedly be best done in the late summer and fall, when the foliage is still on the trees and when every blighted branch stands out in marked contrast with the healthy green foliage. It is important to cut out blight whenever it is found during the growing season, but this may not be entirely satisfactory, for the reason that new infections are continually taking place. No matter how thoroughly one cuts out the disease in the nursery or young orchard in July, a week or so later he may find the disease as bad again from the development of cases which he could not detect at the time of cutting. All this is changed, however, when growth ceases in summer or fall. During drouth in August is a very favorable time to exterminate the disease. In cutting out the blight, great care should be exercised always to cut on sound wood. If by any accident the knife should become contaminated by cutting through infected bark or tissue, it should be disinfected by washing with a five per cent. solution of carbolic acid, or a very dilute solution of corrosive sublimate. We prefer the former because the corrosive sublimate is colorless and dangerous to have around.

So far we have spoken only of the extermination of the blight from an infected orchard. It is far better and easier to prevent the disease from gaining a foothold. This may be done by making a thorough inspection of all trees liable to this disease, two or three times during the growing season. The first inspection should be made about two weeks after the bloom is shed and the last in the fall just before the leaves are dropped. By this means the first case of the disease brought by a bird or flying insect will be detected and destroyed. The blighted twig, with its cluster of dead leaves, stands out in strong contrast against a background of green foliage.

DISCUSSION.

Q: I would like to inquire if Prof. Waite has ever used spraying for strawberry rust.

Prof. Waite: I have not used it myself, but we have reports of others who have used it.

Q: What is the general effect of it?

Prof. Waite: The thing was almost dropped at one time, four or five years ago, but lately such favorable reports have been given that the matter has come up as of importance. The past season Mr. Hale of Connecticut had some exceedingly fine beds that were largely the result of spraying, while check-rows left unsprayed were badly injured. Many of the varieties that leaf-blight affects so badly that they have practically been abandoned or placed low on the scale of importance, could probably be very well kept free from the disease by spraying.

Q: Are there any bulletins in which these reports are given?

Prof. Waite: No, there are not, to my knowledge. There may be something coming out. This is the time of year, you know, in which those things appear.

Q: Do you use the regular Bordeaux mixture?

Prof. Waite: Yes, sir.

Q: The strength?

Prof. Waite: I do not know the exact formula, but I would use the fifty-gallon formula; that is, six pounds of blue-stone to fifty gallons of water—that is what you meant by strength? A Member: Yes, sir.

Prof. Taft: You spoke of spraying peaches with Bordeaux mixture. I have used the ordinary strength five or six years and have had no harm whatever.

Prof. Waite: There is no question about its preventing curl-leaf, and the curious thing is that many people have done just as you have done and had no harm; but on the other hand, we get most terrific reports of whole orchards defoliated by the use of it, so we are very cautious about recommending it. We do not understand the conditions yet under which we can spray with Bordeaux mixture.

Mr. Morrill: It has been used very freely in this state.

Prof. Waite: Well, it defoliated the trees in some cases.

Mr. Morrill: Are these reports you have from people who are careful and who put no insecticide in it? Prof. Waite: Yes, sir.

Mr. Morrill: I know where there has been a great deal of damage done as the result of using Paris green with Bordeaux.

Prof. Waite: But even with the best of Bordeaux there has been. Of course, there has been some very successful spraying of the peach, but we have come to the conclusion, after this year's experience, that we are not going to recommend it until we know more about it. If people wish to spray with it, all right; but they can do it on their own responsibility.

Mr. Morrill: I have sprayed my peach orchards six years with Bordeaux mixture, fifty-gallon formula, and never had the drop of a leaf from that.

Prof. Waite: Well, Mr. Hale took the leaves off of his whole Connecticut orchard. Then he went to work and applied a strong percentage of nitrate of soda, and the trees grew a new set of leaves.

Mr. Morrill: Saved the crop?

Prof. Waite: Saved the crop, after a fashion, all but the quality. They gave a very bright-colored fruit, because the sun shone through the trees more than it should have done. It colored them up, but they were not right.

Q: If half of the top of a pear tree is black with pear-blight, is it possible to save the life of the tree?

Prof. Waite: O, yes. Every inch of good wood below the point actually reached by the disease is perfectly healthy.

Q: Below where the leaves are, say, are six inches where the bark has blight too.

Prof. Waite: Yes; that is, where the disease is in the bark.

Q: How will you do it?

Prof. Waite: You get down below the lowest point in which you can find any disease, and then to make certain you are obliged to cut a foot or two below that, to be sure that you have got to sound wood. All the cutting must be done to absolutely sound wood. The point is to dress down the bark and see how far down it is sound. A: Yes, and cut it off.

Prof. Taft: You may have, for instance, half of the top discolored, and the blight not reach the main forks of the tree, nevertheless; or, you may have very little blight in the top of the tree and the tree be gone. You have to make a special study of each case.

Q: Can you keep pear-blight out of an orchard entirely?

Prof. Waite: I neglected to say that. That is, I believe, the only way to deal with the pear-blight question, to keep the blight out of the orchard.

Mr. Morrill: That is, by cutting immediately.

Prof. Waite: By not letting it go. The first blight that comes into the orchard must come by a bird or by a bee or something like that, almost always, probably; we are very nearly certain that it comes in about blossom time in the spring, but it may come in the summer time. The proper thing to do in starting a young orchard is to make a thorough inspection right after blooming time, and then at intervals of, say, about two weeks to a month during the summer; and be sure that every bad leaf in the orchard is accounted for and the blight cut out. The proper time to finish up your work for the year is at the close of the growing period, because infection can only take place while the trees are growing, so that no new infections can take place after the full growth. If there is a full growth in September, you must begin after that. You can, of course, go over the trees in the winter time, but it is not nearly so convenient, because you have not the dead leaves to guide you to the cases of blight. In the fall you have a regular sign held up to you. The two main times for inspection are right after blooming, when you would see the fruit spore that was blighting, and in the fall, after the last growth, to be sure that none is left over the winter; and you should inspect the orchard just as thoroughly when there is no blight in it as when it is full. In other words, look out for the first case of pear-blight that appears. This inspection should not consist in merely driving over the orchard and around it, but should consist in going up and down every row. I doubt very much if a person could give a satisfactory inspection of an orchard two or three years old unless he went up one side and down the other side of that row, bending his whole attention to the side of the tree he was on. He can not ride through on horseback nor any other way. He must look every tree over, to be sure there is no blight in it.

Q: There is no preventive?

Prof. Waite: Why, no, not after the blight is in the tissues, because it is beyond all reach, so far as we know.

Q: The only cure is the knife?

Prof. Waite: Well, yes; and not the old view of cutting out the blight for the tree. Cut the tree out, if you have to, to get out the blight, for the sake of the rest of the orchard—just the same as we keep cholera out of New York, by quarantine.

Q: The same as we do with yellows here? Prof. Waite: Yes.

Q: Only you don't have to cut off the whole tree, sometimes.

Prof. Waite: No. You have a fair chance to save your tree in blight.

Q: Is it a fact that a tree is struck with blight if there is dead leaves found on the tree?

Prof. Waite: No, because a branch is oftentimes broken off, say.

Q: Dead on the tree?

Prof. Waite: Sometimes, if it is a strong, thrifty tree in which you can say there is no other means of accounting for it, it would be pretty good presumption that there was a case of blight.

Q: I have a pear tree that has shed its foliage three successive years, about the last of August; but it comes on and looks all right in the spring; about the last of August it sheds its foliage, dies off, and the leaves all drop.

Prof. Waite: Well, that is probably scab or leaf-blight, not pear-blight. Pear-blight leaves never shed off, and that is a peculiarity about them, for the reason that these germs go at it the other way. You know the cutting off of a leaf is a normal process of a tree. It is all done in a little part that exists in the joint where the leaf joins the stem; but pear blight kills that joint the first thing, before it kills the leaf, so the leaf has to stick on. It is one of the good symptoms, that the leaves stick on.

Q: Spraying will not help blight?

Prof. Waite: It will not help it, neither will Bordeaux mixture.

QUESTIONS.

WOOD ASHES FOR THE PEACH ORCHARD.

Would it be profitable to haul ashes a mile and a half to put on a peach orchard?

Mr. Morrill: Certainly, I would, on light soil.

Q: On sandy gravelly soil?

Mr. Morrill: O yes, I would haul them further than that. I would haul them three times that, or four times, and I would put them on liberally, too. Leaching takes a large percentage of the potash out, but carbonate of lime is still left and some phosphoric acid is still there. It is worth hauling. The mechanical action of leached ashes is excellent.

Mr. Chase: You speak of using hardwood ashes. Is there a difference between hardwood ashes and softwood?

Mr. Morrill: O, a great difference, yes. Pine does not make much ash, and it is very poor what you do get; but what we know as hardwood includes elm, basswood, poplar. Elm is very rich in potash.

SIZE OF PEACH TREES FOR SETTING.

Q: I would like to ask, in a fair-size orchard what size of tree you prefer to set, of peach tree?

Mr. Morrill: Well, I do not care very much what the size of the tree is. I will get size afterward. What I am after is the vitality of the tree and the knowledge that it is true to name and has not been injured and is reasonably thrifty. I am not hunting for the biggest trees. I am a little peculiar about that. I get just as nice results from those little trees as I do from a great big tree, six or seven feet through. The principal thing is to get a tree that has not been injured in the nursery or in handling from the nursery.

Q: Where do you get your trees?

Mr. Morrill: Generally I raise them myself, and now I am buying of the West Michigan nursery, because they are right by me. For the most of my orchard I have grown my own trees. Something was spoken of today in regard to bud variation that made me wish to say something, and I guess I did speak of it. I selected my trees just as Prof. Waite says he would, take the chances that way anyway, of selecting the best, whether there is anything in the theory or not. You will always find certain specimens of a kind doing better than others. I do not know whether there is anything in it or not, but there certainly is not anything against it.

Q: Where do you get your pits?

Mr. Morrill: We have to get pits down in Tennessee and North Carolina, to get pits that we think are all right.

Q: Why?

Mr. Morrill: We know there is no disease there. They grow a strong stock. They are all right. There is an element of danger in all our northern pits, I think.

WHERE PEACHES CAN BE GROWN.

Q: Do you think we could raise a good peach orchard in this section of the state?

Mr. Morrill: I am sure I do not know, sir; I don't know what your elevations are, nor what your temperatures, but I should rather think it was against you, except, perhaps, in favored locations.

Q: This is right on the water-shed of the lower peninsula, we are elevated here, it is lower on either side of us.

Mr. Morrill: Well, does it shed water?

Q: Yes, the water sheds here to both lakes, Huron and Michigan.

Mr. Morrill: It is safe to say that you can grow peaches anywhere in Michigan that you have good atmospheric drainage, where your temperature does not go more than fifteen degrees below zero. At the same time, some varieties under certain conditions, that we are now growing in Michigan, have been known to stand as low a temperature as twenty-four degrees below zero and still produce fruit. Lewis has done that, and Gold Drop has done so at as low as twenty-two.

Q: How is Crosby under low temperature?

Mr. Morrill: I have seen it tested but once, a year ago this winter, eighteen below zero, buds in fair condition. It was planted alongside of Fitzgerald and Lewis, which I consider two very hardy varieties. I cut two hundred buds, selected perhaps from a half dozen trees each. Crosby showed 27 dead buds, Lewis 14, and Fitzgerald 3; and Fitzgerald is a far better peach than Crosby when you get it.

Q: I would like to ask Mr. Morrill if he has the Garfield peach?

Mr. Morrill: I have not. I have seen it. It is known as Brigdon also. It is a New York peach and is of the Crawford type. I know little about its peculiarities.

MORE THAN ONE SORT OF FRUIT AT A TIME.

Mr. Allen: This vicinity seems to be well adapted to cultivation of the Northern Spy apple; that is, it seems to succeed here. Of course, peaches are not sure enough, and the temperature here in winter may be the reason for it. I have a piece of ground that I think possibly I might raise peaches on with partial success. Could I set out peach trees upon that ground, say twenty feet apart, and then put an apple tree, a Northern Spy tree—why could not I take the chances of getting a few crops of peaches, and then, when the apple trees get large enough, cut out the peach trees?

President Morrill: I will refer that to Mr. Graham.

Mr. Graham: Well, we have tried that in our section considerably and given it up as a failure. The situation is just this: If your section is suitable for peaches and your peach orchard succeeds, why, you will be cutting down your apple trees. You would better have your peach orchard by itself. I do not think it good practice to mix the two, for various reasons. I would very much rather plant my peach trees sixteen or twenty feet apart, and by themselves.

Mr. Morrill: I believe that is the experience of nearly all the old growers in the state.

APPLES IN GRATIOT COUNTY.

Q: Would an apple orchard of from twenty to forty acres be profitable in Gratiot county? If so, what varieties should be planted and in what proportion?

Secretary Reid: It would be well for some person in Gratiot county to say whether the apple grows thriftily here and bears ordinarily each year or each alternate year, and whether there are any peculiar conditions that are different from what they know to exist anywhere else in the state. If that information is given from the people here, the questioner could tell the probability of the profit.

Mr. Brook: I think the apple does very well in this section of country, as well as any other fruit, tree fruit, that we have. I think it is or could be successfully grown here. I do not think there is any question about that.

Q: Is it ever marketed here in large quantities?

Mr. Brook: No. That is the point, exactly. If a man raises a large crop of apples here, what is he going to do with it, how is he going to market it, how can he do it profitably?

Dr. Beal: It depends on whether the apples are really good.

Mr. Brook: Well, I understand that, and the supposition is that they are.

Mr. Allen: I was born and brought up in this county; and years ago, before there were any insect pests, we used to raise lots of apples, and of course sell to the local market; never shipped any to amount to anything, because they were not raised in large enough quantities. Of course, anything that is shipped has to be handled in quantities, to make it pay. But the orchards have been sadly neglected of late years, especially the old orchards. Some people are setting out new orchards and the trees seem to thrive and do well, and we raise some of the best Spies I ever saw, and also good Baldwins. They are the only two really salable apples we have ever raised. The Spy and Baldwin we could sell without any trouble, and of course we have summer apples in plentiful supply—that is, early apples.

Of Yellow Harvest and Red Astrachan we have many. On the higher ground between here and St. Louis, the first two miles out of the village, there are some very good orchards, yet they have not taken good care of them. They are elevated and produce good crops.

Mr. Reid: I suppose it might be said, then, that if they grow good apples in Gratiot county they will be sure of a market, providing they have enough to attract buyers here.

Q: What varieties should be planted, and in what proportion?

Prof. Taft: It seems to me there is more occasion for some local grower to answer that then there would be for another. But of varieties that are commonly grown Northern Spy and Wagener and perhaps Red Canada, would do well for this section. Of the other apples, or those less known, I should certainly try Hubbardston and Sutton as well as Jonathan. The latter should be in the first list, and Hubbardston and Sutton I would put out to try.

Mr. Morrill: Those are all winter apples. I believe the conditions here would rather preclude expectation of profit in summer apples, would they not?

Prof. Taft: I would not put out many. Yellow Transparent, I think, is the best of its season, and Oldenberg would also be well to grow here. Wealthy is also another hardy and productive fall variety. Of the other kinds that ought to do well, Shiawassee I would mention.

Mr. Allen: I have lived here forty years, and I do not know of a good orchard on low land. On the high, rolling land you can raise good fruit.

Prof. Tracy: I feel very earnestly that it would be of immense benefit to this county if there were a great many hundreds of little orchards of two, three, four or five dozen trees. I think that the gentleman who last spoke referred to coming here forty years ago and having apples do well. That comes up every now and then. We hear people who are old settlers referring to the brighter times there were in earlier days. Now, it seems to me that when you come to an analysis of that, that one great source of the happier time, of the fruit being better, was the interest the settlers took in their farms and in their new region; and today so many people in this county (unless it differs from other counties in this state), the younger people especially, have lost interest in the farm and in the village and in their personal surroundings—lost very largely their interest in the homes. Now, my friends, I believe there is nothing so potent to keep a boy interested in the place where he lives, and so grow up into a public-spirited man who will care for his home, his village, his county, his state, and his country, as a little interest in some garden or some orchard about the house. Look back to your earlier days, and do not the pleasant memories cluster about some plant or tree that grew then? As you look back, is not that true of all of you? You may think you do not care for the tree now; but is it not true, when you think of the old home you think of some tree or plant that was there? I think that is just as true today as it was then, and that immeasurable good will come to the community by a revival of the old interests in the immediate surroundings, in tree-planting by the roadside and the development of the beauty and homelikeness of the home. If we can have something that will interest the children as they grow up it will develop a love for the immediate home, for the town, for the county, for the state, and for the country. It will blot out a great deal of this selfishness, this ruling of trusts and the ignoring of the good of the community for the sake of the good of the individual which we see plainly is sapping our national life.

Mr. Allen: Let me just merely come back to the matter of apples in Gratiot county. I think from what I have seen that Gratiot county would be a good one for apple-growing, but when I come to think of what we have had before us the last few days, I do not think there was a farmer present last night, who saw how carefully the orchards had been cultivated, that can bring to mind an apple orchard in Gratiot county that has ever been cultivated for apples. So far as I have seen, all the apple orchards are in grass, and have been so for years. It is very seldom they are plowed, but how they are going to continue to grow grass in the orchards and grow apples also, and not invite the insects, and expect to get crops of apples, I can not understand. I do not think there is any other reason that we do not have big crops of fine apples any more, than that we do not attend to the growing of them.

Dr. Beal: I would like to call on Prof. Taft to state what he thinks about growing grass or sod among apple trees in Michigan, under any circumstances. He has made some experiments and been over the state a good deal.

Prof. Taft: I think that as a rule you get the best results if you have the orchards under cultivation. There are possibly a few instances, on some soils and in certain locations, where you could meet with fair success with sod around the trees; but taking the average orchard land, the trees need everything there is in the soil. In a dry season you are very likely to have the crop shortened and the growth of the trees injured by the grass taking the water and plant food that the tree needs. I have seen some soils where I thought it would answer, for a part of the time at least, to have an ordinary meadow in the orchard. I have seen this in some of the deep, rich loam soils that were naturally moist, where the trees did perhaps fully as well as the ordinary orchards under cultivation, but those are few and far between. So far as my own experiments go, to illustrate the benefit of cultivation, as it seems to me I should show by this, I for a number of years kept one side of a large orchard at the college in sod. We took off the first crop of hay and the trees there were noticed to be affected by this sod. As compared with the trees in the same orchard just beyond, in the adjoining rows, some varieties were of a very pale yellowish-green color; the fruit as a rule was quite small, and in every way the trees did not make the showing that the others did; and, comparing our own orchard that is kept cultivated, with the neighboring orchards, I can see there is a great difference in the quantity of fruit and its size. Of course, the spraying perhaps has something to do with this last case, for we have sprayed the orchard while many of the orchards around there are not sprayed; but, comparing the sod land with the cultivated land that had the same conditions so far as spraying and other care was concerned, those who went through the orchards as I did each year and noticed the result of having the sod, were, I think, convinced that it did not pay, at least on that kind of soil. There are other soils, too, where it might be well, possibly, to sow peas or something of that kind in the spring and have the hogs kept there after the fruit commences to drop from the trees. In that case they work the ground over and at the time when the tree wants most of the moisture, it can get it all right; at the same time, the hogs go after the worms in the fallen fruit. In some places also they find the use of clover occasionally a good thing in an orchard, seeding down, say, a year or so, and after that giving two or three years of cultivation. In some rich soils, particularly in the states to the south of us—Illinois and Missouri—I have oftentimes seen young orchards making a very strong, thrifty growth that did not bear; and by seeding them to clover a year they were checked in growth, and fruit buds formed and a crop was secured. I believe that for nine tenths of the apple orchards of Michigan the cultivation of a cover crop in the fall and winter would be best.

Mr. Allen: I think many of the residents of this county who have lived here any great length of time can look back to the first orchards we had and see very plainly what was the matter. When the farmers first located here and cleared up a little plat of land they were all anxious to get fruit. A great many of the people came from New York, already a fruit country. They set out some trees and were very careful with them. They had only a small amount of land cleared and they cultivated it thoroughly. I can remember when I was little, and father was plowing the orchard, I went along and pulled up the whiffletrees as we passed the trees. If we touched one he said, "There! there! you have damaged the tree." You can see that from a thorough cultivation of the orchards we always had plenty of fruit. We used to raise lots of peaches here. We have still a few peach orchards, small ones. They are in grass, not sprayed nor any such thing. But I can remember that upward of twenty-five years ago we had a peach orchard of probably fifteen or twenty trees. I have known of our having sixty bushels of peaches on that orchard, all we wanted to use, and peaches laid around and wasted, and there never was a year passed but we had all we wanted to use. We have set out a small peach orchard twice since then, but the winter seemed to be a little too severe for it.

Mr. Kellogg: It seems to me that this whole apple orchard business in Gratiot county has dwindled down to the simple fact that insects and diseases have come and nobody has fought them, and they have possession.

Mr. Morrill: The insects and disease have whipped the farmer.

Mr. Kellogg: Yes; and now the farmers have the means to whip the insects.

Secretary Reid: What age of tree should be planted—apple tree?

Prof. Taft: I think as a rule I should recommend two-year-old trees.

Secretary Reid: How far apart should they be planted?

Prof. Taft: I think for the trees that are of large size, forty feet. Sometimes, for the small-growing trees, like the Wagener, a smaller distance would answer very well. While a two-year-old apple tree seems to me best for the average grower, sometimes we find a well-grown yearling tree better for that purpose. You will get them a little cheaper and they are easier to transport, so that there will be less charges for the packing and freight. They will be easier to plant, and would as a rule come into bearing just about as soon. So, for many persons who would give them good care and knew how to form the head, I think a good yearling tree would be just as good or a little better; but as a rule I would recommend a two-year-old tree and nothing older than that for the apple.

BEST ORCHARD PLOWS.

Q: What is the best one-horse plow for plowing close to grapevines and orchard trees?

Mr. Graham: I can not really say. I presume in every section of country there is a different make of plow, probably, and all of them are similar. Through our country we use almost universally the Bissell No. 7 for that purpose—a one-horse plow.

Mr. Morrill: So do I.

Mr. Graham: It is very easily adjusted and gives good satisfaction. The handles are also adjustable. It is so that you can set it either to or from the row.

Mr. Morrill: I have three or four of these Bissells, made at South Bend, Indiana.

CROP CONDITIONS OF THE YEAR.

Secretary Reid: There is one question upon the table of a quite general scope and character: "What about the present season's crops, also conditions of orchards, health, insect pests and diseases?" That means the past season, of course.

Mr. Graham: With us some crops were very satisfactory, so far as production was concerned. I presume that holds good throughout the whole state. The small-fruit crops were variable, but the quality was good. Of course we understand the prices were low.

Mr. Morrill: The crop was more satisfactory than the prices.

Mr. Graham: There was no crop at all of apples, and peaches were a very short crop. Taking it altogether, with the peaches, they brought in considerable money and the prices were very satisfactory. The crop of grapes was very large and the prices fairly satisfactory for so large a crop; the cherry crop was good and the prices good. I think the present condition of the orchards is first-class. I do not remember a season when the orchards, especially the peach and plum, and the berries—raspberries, blackberries, currants—went into winter quarters in better shape than they are this year. The buds seem to be sound and hardy and the trees have dropped their foliage at about the right time, neither too early nor too late.

Mr. Morrill: What about insect pests and diseases the past season?

Mr. Graham: I think there has been an increase, both of insect pests and diseases. There was a very short crop, especially of the tree fruits. The condition of the weather prevented a great many people from spraying who otherwise might have done so. It seemed almost useless to attempt to spray an orchard last spring. It was raining almost every day and freezing every night about the time we ought to have been spraying. There was a weakened condition of the trees. It seems to me the insects were worse than ever, and I know yellows has been worse in our section than any season of which I can remember, although I think the commissioners usually have been watchful and careful in taking out infected trees.

Mr. Morrill: Well, have the people themselves?

Mr. Graham: Certain classes of people always are, of course; other classes are not.

Mr. Morrill: Is there any improvement noticeable in that among the people?

Mr. Graham: I do not know that I am prepared to say. I know quite a number in my immediate vicinity. We never have had any trouble in that township, to amount to anything. Of course, the first season there was some objection to taking out trees—the first season the commissioners acted. Since then I think they have been taken out without any difficulty whatever and without any bother; but this year, in some of the adjoining townships, especially in Ottawa county, which adjoins my own township, there has been a good deal of trouble. You recollect that when we were at Grand Haven there was a good deal of complaint that the commissioners would not work, they would not take out the trees, and several of the commissioners have been to see me regarding the law and what authority they might have, and of course the only thing to do was to refer them to the nursery and orchard inspector, which I have done. In the township of Wright, I think Prof. Taft was called upon at one time by Mr. Wilde, and he has been having a very great deal of trouble in that township. Taking it altogether, I suppose there was as much trouble from the activity of the commissioners this season, as much trouble as ever has been in those townships where their work is practically a new thing. I do think, however, that the commissioners have been far more active this season than ever before in the section around Grand Rapids.

Mr. Hale: The small fruits in Oceana county were an enormous crop. Everything we had was good and prices very unsatisfactory. The apple crop was very short, and the peach and plum crops were short also.

Mr. Morrill: What do you say of the present condition of your orchards? Mr. Hale: It is good.

Mr. Kellogg: Did you have a severe drouth up there in October?

Mr. Hale: We had a drouth.

Mr. Morrill: What about the pests and diseases?

Mr. Hale: I do not think that on the whole they are any worse than in other years. The plum has a good deal to contend with. With the curculio we did not have as much trouble as usual, on account of the cold weather, and other pests we have not noticed to be any worse than usual; but the diseases of trees, especially yellows, were worse than ever. In fact, it is the first season we have had very much difficulty with that disease. We have quite a good deal of it now.

Mr. Kellogg: I am more largely interested in small fruits than anything else. On my farm everything is in good condition, because we irrigated during the drouth. On other lands the strawberries are almost nothing. The plants hardly stooled any, there being no rain, just light rains that wet only the top of the ground and dried out again within a few hours after the hot sun came out, from the latter part of July until the middle of October. Of the small fruits, the raspberries are in fair condition and of currants and gooseberries there was a good deal of leaf-blight. I noticed that from one little patch the leaves all went off in August, and they made only a spindling growth. There was a fungus on them. Where they were watered and kept up in good shape they were all right when winter set in.

Mr. Morrill: Is much attention paid to spraying of those things in your section?

Mr. Kellogg: No; that is, not enough.

Mr. Fifield: In Berrien county we had an immense crop of small fruit this year, fully all that the people wished to handle at the prices they could get. In regard to diseases, in some portions of the county peach yellows has been on the increase a little, I think, but they have been complying strictly with the law and I do not know of any case where there has been any difficulty. They realize from past experience what it means to let those things go, and so they are taking care of them. I think the conditions are favorable for another season.

Mr. Mason: I live in the northeast part of Ionia county, and so far as my observation has extended there is a present prospect of a crop, and in our vicinity the small fruits are in fair shape. We suffered by the drouth some, but my strawberry lot is in as good shape as it usually is, and also the raspberries; and the outlook for peaches is as good as it was a year ago. So far as the apple is concerned, I do not know much about it, but of course the peaches I took from my own observation. They are as full of buds as they were a year ago.

Mr. Brooke: So far as I have learned the apple crop in Gratiot county was almost a failure. The fruits were generally under-size. I do not know whether it was because of the large crop last year. I do not think that would be a sufficient reason, because I do not think that Northern Spies last year bore an unusually large crop, but this year they seemed to be under-size. Berries were a very good crop, but suffered some from blight or fungous diseases; they fell off largely. In regard to plums, I have seen a few orchards where the crop has been fairly good. The small fruit was abundant; in fact, I never saw a crop that was its equal. Every bush and every plant, no matter where it grew, had a crop of berries.

PLOWING APPLE ORCHARDS.

Mr. Smith: In regard to plowing orchards, if you had an orchard that was in weeds, how would you go at it to change it?

Mr. Kellogg: Now, there is a point that you should study. You should begin to plow your orchard just so deep, and never put a plow half an inch deeper. I do not think much of plowing orchards, anyhow—that is, I mean deep plowing. The roots of an orchard like to come near the light. If we study the habits of the root and its requirements a little, I think we shall stop plowing deeply in orchards. I believe the roots of a good many orchards go down too deep—the roots are sent down so deep that they do not get the sun's rays. The whole question of plowing has undergone a change—that is, I have undergone a change, the plowing has not. I used to think it necessary to plow twelve inches deep, and then I would subsoil just as much deeper as I could; and I would subsoil under certain conditions now. I once subsoiled about eighteen inches deep and plowed twelve inches—that made thirty. But I am inclined to think that was a foolish thing to do, even if you could do it. The greatest sight I ever saw was Mr. Morrill's orchard. Mr. Fifield took me in a carriage and drove over to his orchard. He uses a Breed weeder. Do you ever plow that at all?

Mr. Morrill: Yes, sir; two and a half inches deep.

Mr. Kellogg: Then he uses a Breed weeder and goes over it. He simply keeps that dust mulch on, and he uses a good deal of bone and ashes. I remember they were spreading ashes on it the day I was there. He has an immense ash-house, about a hundred feet long, it looked to me. I dug down, at an intimation from Mr. Fifield, just threw back the dirt not more than two inches. It was a sight that I never will forget. On that ground there were just untold millions of little roots. You could see them reaching up after the bone and ashes. You all know that if you plow seeds down they will not germinate, unless they can get the warmth of the sun. You get the roots away down in that cold ground, plow deep and get them away down below there. I do not believe it is right. I believe that deep plowing in the orchard has contributed more than any other one thing, except general carelessness, to the lack of success. What is the use of fertilizing and manuring a foot deep? Why not concentrate it where the plants can use it? I commence to plow an orchard very shallow. When you commence plowing it shallow, do just as Mr. Morrill does. You would have to pay Mr. Morrill a big price for the privilege of plowing in his orchard four inches deep. If any crop is to be put into an orchard I would have some soft crop. I believe if we could manage to plow under peas and get a very soft humus right on top of the ground, not more than three inches, it would be the best thing out. I should in such case plow the orchard two or three inches deep and work it down very gradually.

Prof. Waite: I would like to ask Mr. Kellogg if he thinks his methods would apply to unirrigated soil?

Mr. Kellogg: Well, Mr. Morrill does not irrigate. Mr. Morrill keeps a dust mulch on his soil all summer long. At least he did that summer, that was the dry summer of 1895. How many times was it you said you had been over it?

Mr. Morrill: We go over our orchards from twenty-five to forty times during the season.

Mr. Kellogg: You can go over fifteen or twenty acres per day.

A MISTAKE IN STRAWBERRY CULTURE.

Mr. Kellogg: I spoke in this society once, recommending the Breed weeder for strawberries. It is all right for everything else, but I made a great blunder in recommending it for strawberries. Once in a while I think I have a big thing, when it is a mistake. Confession is good for the soul. I said some things about that, but I would like to swallow them. Now, it does leave such a nice mellow soil all over the top of the ground, and I was greatly pleased with it. A strawberry plant is different from any other plant. New roots start out in the spring, and they start above the old ones. That is one of the little things that escaped my attention. The Breed weeder will tear them right off, and keep tearing them off every time you use it. It is too harsh, and it loosens up a good many plants. I got a new one with small teeth and paid $12 for it, and I set a man to cultivating with it last spring. He got there a little before I did and had had gone over a dozen yards. The plants had been set some days. I went out and looked at the work, and began to yell, and scared the people half to death. I said, "Lay that thing right up." I ran out and told him to "sit down! stop! Take this away and never take it into another strawberry field." It was a blunder. But I would use the Breed weeder on spring set raspberries. I do that now. I have not thrown my weeders away. I would use them on corn, but I don't use them on strawberries. I wish to call your attention to one thing: You must not use anything that will jam a strawberry crown. When you injure the crown the plant never will grow. Pinch a strawberry plant and it will not grow. I would rather take that weeder into the cornfield than any two other implements of which I ever read. I assume it is good, soft, loam soil. So I would in most anything else. I raise a good many blackberry plants and I use the weeder among them. I never have found anything equal, as a whole, for strawberries, to a twelve-tooth cultivator with a fertilizer attachment. There are several of them that we use on the farm.

Mr. Mason: I used the Breed weeder all summer in my strawberries, but I took out two teeth where they come near the row. I can take two teeth out of my Breed weeder and do nicer work than Mr. Kellogg can with his Planet jr. cultivator. I have also used weeder in my young peach trees when they were not an inch high.

Mr. Kellogg: Well, they have no roots to rip off near the surface.

Mr. Morrill: I would not wish the Breed weeder to get into bad repute anywhere, because I use it.

THE WEST MICHIGAN FRUIT GROWERS' ASSOCIATION.

PROCEEDINGS OF THE ANNUAL MEETING, IN HOLLAND, JUNE 2, 3, AND 4, 1897.

Commencing Wednesday evening, June 2, and continuing until Friday noon, there was held in the beautiful city of Holland, Ottawa county, one of the most interesting horticultural meetings that have been held in some time. This meeting was held in connection with the Ottawa Horticultural society and the Ottawa County Forestry association, the sessions being held in the Y. M. C. A. hall, which was decorated by the citizens with potted plants and many beautiful flowers.

The programme, as prepared by Secretary R. M. Kellogg of Three Rivers, and the chairman of the executive committee, Walter Phillips, was a good one, and brought out the largest array of well-written papers ever presented at any meeting of a local organization.

Wednesday evening the meeting was called to order by Secretary Kellogg, and, as he had received a letter from President F. J. Russell of Hart, saying that his court duties would not permit his being in attendance, the Hon. D. W. Wiley of Douglas was elected to preside during the meeting.

Resolutions of respect to the members who had died since the last preceding meeting, and of thanks to those citizens of Holland who had assisted in entertaining the society, were passed, after which the election of officers was taken up. A communication from Judge Russell, stating that it would be impossible for him to serve another year, resulted in the choice falling upon Walter Phillips of Grand Haven, who accepted the position with the understanding that he was to fill for the unexpired term and no longer.

Secretary R. M. Kellogg stated that his health would not permit of doing any more work and he would positively decline to serve longer. C. A. French of Grand Rapids was then elected secretary.

The remainder of the officers are as follows: Treasurer, Alexander Hamilton, Bangor; vice-presidents, N. P. Husted, Lowell; A. Adams, Shelby; G. H. La Fleur, Moline; J. M. Bigelow, Bangor; A. G. Van Hees, Zeeland. The executive board as elected is: J. A. Pearce, Grand Rapids, chairman; S. R. Lewis, Hart; R. M. Kellogg, Three Rivers; C. E. Bassett, Fennville; J. G. Ramsdell, Traverse City.

Committee on New Fruits and Diseases—N. P. Husted, Lowell, chairman; A. G. Van Hees, Zeeland; A. Adams, Shelby; W. A. Smith, Benton Harbor; J. A. Pearce, Grand Rapids; J. M. Bigelow, Bangor.

With the election of officers closed one of the most interesting and successful meetings ever held by this society, and those fruitgrowers who were not in attendance missed a rare opportunity of gaining much valuable information.

PLANNING AND PLANTING A YOUNG ORCHARD.

BY MR. A. G. VAN HESS OF ZEELAND.

The subject allotted to me on the programme is almost too important for a new beginner in the line of horticulture to handle, as a great deal depends on the beginning of every undertaking or enterprise, and especially in planting an orchard. Still, we will try to give our views on the question of planning and planting an orchard.

A person who intends to set out an orchard has to have a proper knowledge of the habits and requirements of the different varieties of fruit trees, and also of the soil. We will call your attention to a few of the manifold questions to be decided. Peach and plum trees can stand close planting, while pears and cherries require more room and apples more so (also in regard to the adaptation of the soil for each different variety) and not to plant peach trees like the man who asked Mr. Morrill "What the matter was with his peach trees, as they made a vigorous growth every fall and in the spring the young growth was dead," who was answered by the question "On what soil he had his trees," and his answer was "on a low bottom." And no wonder this man had no success. So we see it is not enough to buy a tree and dig a hole to put it in, as was done by our pioneers forty-five or fifty years ago, or to plant an orchard on unprepared soil, one tree on top of a hillock and the next one in a hollow, where one of the giants of our primitive forest had a place, and so making a difference of surface of from three to four feet, causing the latter to become too deep and the first too shallow planted.

As we do not pretend to be able to do justice to this question, I will merely state how I proceeded to plant an orchard: First I laid out the field into rows by planting sticks at either end of the field thirty-three feet apart, for the purpose to plow every row by itself, to get a dead furrow where I wanted the rows. The field was an old clover and grass sod, which was plowed under six or seven inches in the last days of June and thoroughly cultivated during the summer. In the fall we set sticks eighteen feet apart in the row, for pears and cherries, and fifteen feet for plums, and apples thirty-three feet square. These sticks were so placed that the lines were as straight as the eye could see, which gives a beautiful appearance to an orchard. The trees were planted in the fall, and the next year the soil was plowed with a one-horse plow toward the rows, which made the field in the row level again. So by this time I had a dead-furrow in the middle again, in which, as far as the plum trees were, I set out another row of plum trees by the advice of Mr. Morrill. These are fifteen and sixteen and one half feet apart. And here we would warn everyone who intends to set out fruit trees to study the different varieties of each fruit, as we can not accept everything which is new or that nurserymen have for sale, or buy anything which is cheap. Neither can we throw away old standby varieties as it would not do to ignore our noble Baldwin apple, and so with any other variety of fruit.

It would be no loss of time and expense to such a person to visit some prominent fruitgrower or to spend a couple of days at our Agricultural college, as all the professors take pride in giving instruction and answering all questions, or to send for the bulletins of the experiment station of the college, especially Nos. 142, 143, 144, in regard to the testing of the different varieties of each kind of fruit.

Now, in regard to planting, as every place was located by a lath, I had the holes dug two and one half spades deep and three spades square, and whenever I struck hardpan had it broken up. The surface soil was laid on one side and the lower soil on the other, to be used in filling after the tree was solidly packed down.

Trimming the roots is a necessary thing, as a sharp-cut root will sooner send out small fibrous roots than the broken or bruised root—the way they are sometimes received from the nurseries—and the tops should also be cut back, according to the requirements of the different varieties of fruit, so they will not overbalance the abilities of the roots. In planting care must be taken to spread out the roots in the most natural way and to pack the surface soil with the hands around the roots, then fill up the hole with the lower soil and put the tree in a slightly leaning position toward the southwest.

We do not think much of putting mulch or any kind of manure at the bottom, but the more on the top of the soil the better, even if it is only chips. It is also necessary to keep a good record of what is planted, and therefore we laid out a map in rows, which must be marked or numbered by letters or figures on which row every tree is located, and named so whenever we find a tree dead, we know what variety is wanted. After all this is done, the real care and work have just commenced. To have or insure success a fruitgrower must have his eye on every tree and the cultivation of the soil must be thorough.

DISCUSSION.

Mr. Kellogg thought it a mistake in setting trees to dig a large hole, fill in with surface soil and set the tree on that, for the reason that the hard-pan made a sort of tub, and the water that collected injured the trees. He had just as good results in porous soil setting shallow as setting deep.

Mr. Morrill thought soil of that kind was not good for fruit trees, anyway, and as land was so cheap there was no use of trying to force poor land to do well. He had known of brick clay being mixed with surface earth, and the trees set on that were twice as large as where that plan was not followed. Manure on the surface was a nuisance and should be well worked into the ground, not close up to the trees, but out where the feeders could reach it quickly.

Mr. A. Bos stated that his experiment was that setting trees low was the better way for him, and asked if different varieties of cherry and plum should be mixed.

Mr. Kellogg thought that no great block of one variety should be set without mixing. He had found by mixing berries that he got bigger berries; thought that early varieties should be set on west side of the orchard.

Prof. Taft hardly thought it necessary to set early varieties on west side, for on 180 varieties there was only about two days' difference in the blooming.

Mr. W. A. Smith called attention to the fact that the Bartlett pear is a poor pollenizer, but one of the surest bearers.

Mr. Morrill remarked that it did not affect the value of cross-pollenization, because some varieties of berries would take care of themselves. For instance, the Crescent strawberry would do so if on strong soil.

Mr. Wiley, in making a general review of the subject, said he helped kill two hundred trees, thirty years ago, by setting them in porous land on surface soil, in deep holes. The soil settled down and injured the trees. He thought apple trees could not bear as deep setting as some other trees. His observation led him to believe that the best way is to prepare the ground thoroughly and set the trees on top of ground. He also thought that too much credit was given insects for assisting in pollenization, as the bloom was on but a few days.

Another member said he thought bees carried yellows and were a damage. He had known of one man who went into bees and lost his entire orchard.

Mr. Morrill said he knew one who went to raising hogs extensively and lost all his peach trees also.

At this point Mr. Van Hees raised a laugh by remarking that probably the men paid too much attention to bees and hogs and not enough to trees. Dr. Smith of Washington has been investigating the working of bees and reported that they did not carry yellows.

POSSIBILITIES OF PLUM-GROWING.

BY MR. BENTON GEBHART OF HART.

In cultivating and growing the plum for general market, there is yet a possibility of making it a profitable business, providing certain rules and conditions are carried out.

First in order to success is to have or select a good all-purpose soil. I prefer a heavy, sandy loam with a clay subsoil, if such soil is convenient to have, and, if not, any sandy or clay soil will grow plums. If on sandy soil and quite light, fertilize well, and always plant trees on such soil of the varieties that succeed on peach root.

Select choice, No. 1 stock—strong one-year-old if on peach root, and two years old if on plum root—for planting. Cut off the ends of all large and broken roots, so as to have a clean cut at the end of each root before setting the trees. Head in the top from half to two thirds of its growth; plant with care, setting trees from eighteen to twenty feet apart; cultivate and take the best care each year thereafter; give the young trees an annual pruning, cutting in from one third to one half of the past season's growth of wood each spring until the orchard comes into full bearing. The orchard requires thorough pruning, such as heading in long, straggling growth, thinning out crowded tops and limbs that cross each other.

And unless one has a stiff clay, or moist and cold location, for his orchard, I would always select and plant all varieties that can be grown on peach root, for the simple reason that the trees are just as long-lived and even longer, sometimes, than on plum roots. Young orchards on the peach are much the finer and faster growers; have larger and finer foliage, and will carry their heavy crops of fruit, in case of a drought, much better than on the plum root. There is an objection to having the plum on peach root by many growers on account of the borers, but this is all nonsense, as more trees are killed each year by the borers on the plum root than on the peach with us in Oceana county.

In setting your trees on peach, plant them a little deeper, in order to have the union near the top of the ground, and, furthermore, you never will be troubled with plum sprouts coming up all over your orchard like some varieties do. I have taken out and killed more peach-borers from the Lombard variety on plum root, which had many sprouts cut off at or near the trunk, than I have ever found on all other varieties on the peach during all my past experience of growing plums; and I actually believe a large majority of our bearing plum trees, which die annually, are so injured and partly killed by the borers, and with such heavy crops of fruit, that the loss of such trees is largely due to the borers. One or two borers in a plum root will kill the tree, while, on the peach, it will injure it somewhat, but the tree will soon recover and go on growing as if nothing had ever happened to the trees. This has come under my observation a number of times, and I know it to be a fact.

So, in conclusion, I say, plant your plum orchards with trees budded on the peach root. After the orchard comes into full bearing, say from four to six years from the time of setting the trees, look after the curculio; keep off and destroy all rotten and decayed fruit as much as possible. And the most important duty of all is to never let your trees overbear; thin the fruit off, so that you will not have to prop the limbs up to prevent them from breaking down, as well as to save the life of your trees. Many trees die annually from lack of vitality and over-bearing several years in succession.

The plum is grown and succeeds over a wide territory, and the abundant crops and low prices for its fruit all over the country during the past several seasons, make it rather one of the unprofitable lines of fruitgrowing of recent years. But there is yet a possibility of growing the plum for general market at a good, fair profit if the right varieties are selected and proper care is given the business.

But you will all enquire what to plant, and the majority of growers would say, plant Lombard, Reine Claude, and Blue Damson, and why? Because they are general-market and all-purpose plums. These varieties will bear great crops of fruit and will succeed for nearly every one who plants them, making lots of cheap plums on the market, of course, at a certain time.

But I would advise not to plant those common and all-purpose varieties at the present day if the money or profit in the business is your object. During the past season of 1896, with such low prices on nearly all choice fruits, I had the pleasure and reward of selling all my large, fancy, blue plums at a good, fair profit, at from $1.25 to $1.75 per bushel, net. I would now select and plant only the large, dark, or blue varieties, with the exception of two varieties, and those would be Burbank and Coe's Golden Drop. I certainly would select and plant these two for their fine size and color, as well as for great productiveness of the trees. Both these varieties are of the most excellent quality and the finest canning plums. I sincerely believe that the canners and consumers of our plums will soon look after quality more than the fine appearance of the fruit.

Next, I would select such as Field, Gueii, Hudson Egg, Fellemberg Prune, Monarch, and Grand Duke. There are other choice and profitable varieties, but the above are sufficient to cover the whole season of fruiting time.

And, again, in conclusion, allow me to say that if the preceding suggestions are carried out to the letter and put in thorough practice, there is yet a possibility of a good profit and rich reward in store for the practical plum-grower in future years.

THE LESSON OF 1896 IN PEACH CULTURE.

BY MR. W. A. SMITH OF BENTON HARBOR.

To live and learn are among the most important considerations of humanity. Surely no one, whatever his occupation may be, has greater need of exercise in this direction than the horticulturist. New fruits are continually being brought to our notice and proclaimed as of superior quality, and many of the old varieties a long time in cultivation are no longer desirable, either for home use or for market purposes. Our experience of '96 in peach culture is most conclusive evidence that what is known as the early semi-clingstone fruit is no longer valuable fruit to grow for market. In fact, those peaches never have been such. Cultivation of the peach is now so widely distributed over so large an expanse of country, and through so many zones of latitude, and the transportation facilities so rapid and perfect, that it matters little where the business is located, the markets are relatively near at hand; and when our Michigan early clingstone fruit gets upon the market, it comes into competition, with a better class of fruit from a more southern latitude, and has for many years been condemned, and has had to be sold at a sacrifice. Occasionally, as in '95, when the southern crop was partially cut off, these peaches sell more readily than common, but this was a rare instance. In former years, Hale's Early was our first peach to ripen, and this is still among our best early peaches, though not so early as some other varieties. Whether from climatic causes or from the virgin conditions of the soil in which it was grown, or from the depredation of insect enemies, this variety was subject to rot on the tree, even before maturity, and was known and quoted in the Chicago market as Hale's rot. The lesson of '96 was very conclusive on this point, viz.: that in the long run we can not afford to grow that kind of fruit for commercial purposes.

The year '96 will long be remembered as one of the most prolific fruit seasons in the history of this country. The pear, among large fruits, alone was lacking. Still, there are those who claim that there was no overproduction, and never can be, but it was all owing to under-consumption. The same may be said today in relation to potatoes, that are sold on the market for six, eight, and ten cents per bushel, and yet we know that every family in the land is revelling in the potato-dish two or three times per day; and notwithstanding the low price and glut of our western potato market, the people in New York and other eastern markets are feasting on tubers grown on the mucky lands of Ireland and Scotland. In the case of the peach, perhaps the inability to purchase has more to do in the matter of glut than the capacity to consume. I think that before the record of '97 is made up, people will discover that it will require a larger dollar to buy a bushel of peaches than it did in '96.

One of the most important lessons of '96, to the peach-grower, was the necessity for a wider and more systematic mode of distribution. Michigan peaches in '96 were distributed over a much larger area than ever before. Refrigerating cars will carry our fruit successfully anywhere between the Mississippi on the west and the Atlantic seaboard on the east. This was accomplished in '96, notwithstanding the immense glut all over the country.

Another lesson will long be remembered, viz.: that the more abundant the fruit, and consequently the lower the price, the more we had to pay for the give-away packages. The dealer in this kind of goods was quick to see the handwriting on the wall, and he went for the grower accordingly; and between the manufacturers and the transportation companies, the profits were pretty closely sliced down. The many, many lessons we have had on this point should by this time convince us that a larger and more uniform package would largely reduce our outlay and increase our income. Strange, strange as it may seem, we adhere year after year to these small packages, to our utter loss and to the profit of others who fatten upon our toil. Think of these little mites of baskets, five-pound and six-pound baskets alone costing about fifty per cent. of the gross sale.

In the berry business, too, we cut off our own noses by adhering to the "snide" boxes, and the sixteen-quart case instead of using the twenty-four or thirty-two full-quart package. This is not a new lesson, but it will be reserved for our children to become wiser than we.

Another lesson, perhaps never so strongly presented before, was that of thinning the fruit on the trees. This was so apparent that even a blind man could not help seeing the indispensable necessity of this work; and yet, how many growers utterly neglected to do this work. This was excused on the ground of economy. The practice of this economy, however, cost the peach-growers of Michigan, in '96, tens of thousands of dollars, and was therefore a lesson that should long be remembered. Yet, it is safe to say, it is one that will soon be forgotten. The heavy draft on the trees of such an immense amount of fruit, was enough to tax their very life, to say nothing of the heavy drain upon the soil to mature so large a crop of solid matter in the shape of pits or seed.

When we stop to consider the immense amount of labor necessary to harvest this large crop of small and inferior fruit, the cost of the diminutive "snide" packages—five-to six-pound baskets—the freight and cartage, and the frequent cases of dishonest packing, is it any wonder that the grower's purse remained empty? But even those who thinned their fruit (and here I claim no exception for myself) lacked in moral courage or worldly wisdom.

In California this matter of thinning peaches is reduced to a science. Their distant location from market absolutely demands this thorough work. Why not profit by their example? We know that Michigan peaches, equally well grown, and equally presentable in the market, and of higher color, are far superior in quality and will, side by side and day by day, outsell the California fruit. But not only did we lose heavily in '96, by keeping the markets glutted with our small, inferior fruit, but the loss will be seen and felt in '97. Our trees were so exhausted from the enormous burden of last year's crop, that they will demand one year's rest to recuperate, and they are likely to get it. Thus our ignorance, carelessness, or false economy will cause a double loss.

We have every reason to believe that the production of such an enormous crop of solids in the matter of pits must and will impoverish the soil. Our soils are no longer of the virgin type—constant removal of any crop must in time produce sterility and consequent poverty. Hence the question of fertilizing, after the exhausting crop of '96, is a matter of vital importance. The necessity of using fertilizers of some kind is generally admitted, but opinions differ in regard to the kind. Some would not use barnyard manure, yet this contains all the elements of plant food. Happily for the peach-grower, the forage plant known as crimson clover fills a long-felt want. While it is comparatively inexpensive, it will, I think, if properly managed, prove a veritable blessing to the fruitgrower. Instead of drawing all its plant-food from the soil, as most other crops do, it is claimed to receive most of its nitrogen, which is its principal element, from the air. A report was made some time ago in regard to the value of this crop, seeded down in the spring and plowed under in the fall of the same year. This, upon analysis, indicated a value of $18 per acre. The growth of this plant we know is not full and complete until the second summer, in this latitude about the first of June, when it is in full bloom, presenting a beautiful sight, its bright crimson blossoms over-topping the dark-green foliage below. A single root will sometimes support thirty-five and forty well-developed stems. If the young and immature plants, as stated above, are worth $18 per acre, what would a mature crop be worth? Thus, by the addition of potash, in the application of wood ashes, which is a home product, and bone meal, we can restore and build up the fertility of our fruit lands, as well as farm lands in general.

Another lesson we learned in '96, was that in a year of great plenty and a heavy glut, the buyer becomes the chooser, and nothing but the best seems to satisfy his demands. The demand last year was for yellow-fleshed peaches. For awhile the demand of our buyers on the streets, to fill outside orders, was for "Yellow Crawfords," and almost any large yellow peach would readily sell as a Crawford. I think, everything else being equal, or even unequal, the yellow peach is more in favor than the white.

The prospect now, in our locality, for a peach crop in '97, is somewhat precarious. While some varieties have some showing of a crop, the greater part have little or none; besides, the curl is more general, it set in earlier than common, and bids fair to continue an indefinite time. This condition of the trees never fails to affect the fruit for the worse.

So, all in all, the prospect for peaches in our locality, and I think throughout the county of Berrien, is not flattering.

THE COMING VARIETIES OF PEACH—WHAT SHOULD THEY BE?

BY N. P. HUSTED OF LOWELL.

Presuming that a majority of our experienced peachgrowers are agreed as to the necessity of an improved list of peaches adapted to the wants of producers, shippers, and consumers, we will present briefly our ideas in regard to the qualities they should possess.

First, it would not be advisable to extend the present list unless it can be done by the addition of new sorts with desirable qualities not found in the older varieties. Our peach industry has advanced from a small beginning to such magnitude that the limited list which answered the purpose of small planters in an early day will not meet the requirements of the extensive peach-grower of today. The growers in the different sections of the fruit belt of Michigan would require not a small list. The planter located on sandy soil needs sorts quite different from those suited to a clay loam. So, to meet the wants of planters on the various soils and in the different localities, would require quite an extended list.

The coming peaches should possess in an eminent degree the following qualities: First, the trees should be of robust habit, be strong growers, and very hardy, with heavy, luxuriant foliage, and be regular annual bearers; second, the fruit should be of uniform size, with a smooth, even surface. It should have such a combination of delicate shades and tints of coloring as to rival the works of the finest artist. The flesh should be fine-grained, firm, and solid. It should ripen evenly to the small pit, and be free from rot and mildew. The skin should be tough and velvety, which would in a measure render it impervious to the attacks of insects. In flavor it should be melting, aromatic, excellent. In addition to the above it should possess great shipping and keeping qualities. The value of such a list of peaches could hardly be estimated. Our peach season usually lasts a period of ten to twelve weeks, beginning about the middle of July and continuing until the last of September, and in some seasons until the middle of October and later. A list extending through the season, hardy in tree and bud as the Chili, good shippers, with fruit comparing in size, color, and flavor with Reeves Favorite, Susquehanna, and Foster, or Early Michigan, Oldmixon, and Stump, would be an acquisition greatly to be desired, and of untold value. It would give a great impetus to the business, and would mean more money for the producers, more employment for labor, a large increase in the railroads and transportation lines. Improvement in the quality of peaches would surely lead to an increased consumption. Replace our early clingstones, of inferior flavor and poor shipping qualities, with freestones of good size, bright color, and delicious flavor, and the demand for such fruit will increase faster than the supply. We would say to the favored owners of ideal peach lands, have no fears of over-production, but plant extensively of the best improved sorts, and a bonanza will be surely yours.

GOOD ROADS.

BY HON. GEO. W. MCBRIDE OF GRAND HAVEN.

I commence the discussion with knowledge that your people are aware of the benefits that come from good roads. Holland is one of the pioneers in this work, and the miles of graded and graveled roads that run out from the city show that the primary objects of a good road have been obtained. I therefore enter upon the discussion feeling that I have before me those who are interested in the subject, and that have thought along the lines of a bettering of the highways of the country. How shall this be done, if at all, is the question that confronts us at the present time.

Engineers give us a rule and an estimate of the cost of construction, that runs into the thousands of dollars per mile. You and I are not prepared to join with them in this expensive work. The taxpayer as a rule looks upon this agitation as a scheme of wheelmen to extort money from the pockets of the taxpayer. The contention of the good-roads men is now for a money tax, a change of the present system of pathmasters, and a change in the constitution of the state by which there can be a tax levied upon the property now exempt. These changes are objected to on the part of our farmer friends, upon the grounds that the changing of the present labor tax to a money tax will add to the burdens of the taxpayer, and the change of the system of pathmasters will make it possible for a man to show favors and will act as a hardship; and they oppose the changing of the law so as to make the non-taxable property liable for its share of the highway tax.

We at Grand Rapids submitted to the meeting the idea of changing the labor tax to a money tax, with this proviso, that the highway tax could be worked out as it may be now, asking only that a day's work done on the road should equal that done by a man in the employ of the commissioner. There is now taxable property in the state of Michigan of more than twelve hundred million dollars' worth that does not pay a cent of highway tax. We ask that the tax may become a money tax so that it may become a uniform tax and to apply to all alike. I would like to hear from some man here, giving his reasons why such a change should not be made.

We wish to do away with the present system of pathmasters, for the reason that they are so many and of such a difference of mind and ideas that they confound the system, and as a rule do not improve the highway. The road work, we say, should be uniform, and under some competent person who will and can give to it a thorough oversight, by which the work in one part of a township shall be in line with that done in some other part of the same town. We wish the law changed so as to make this vast amount of property taxable. What is wrong with these propositions? Will some good friend answer?

We are entering upon a new era all along the line of civilization. Men are fast learning that the rule of the long ago is followed in the making and keeping in repair our highways, that in almost every thing else we are advancing, and changing for the better. Are we doing so with our roads? Have we a more important question before us today? It involves the home and all of its surroundings, it enters into the competition of price for the products of the farm. Labor-saving machinery has found a place within the ranks of labor. He who today conducts his business as his father did before him is regarded as a laggard, and will find himself out-classed in the race for favor. Change is seen everywhere, except in the maintenance of the highways of the country.

I believe that the desire for good roads is widespread. The question is, how are we to improve them? Times are hard, and the farm is not paying as well as it used to do. We are taxed now to the utmost of our ability to pay. These are the objections we meet from those who are in accord with us in sentiment.

Let me assure you that it is not the intention of those pushing the good roads question to add to your burdens of taxation, but to unify the system of road work, and to classify the same.

There are many ways that this may be done. One is by changing the work so that much of the real improvement will be done in the winter season. There are many of our people who have horses idle in the winter, and if there was an opportunity to work the roads in the time when there was but little to do with the team, we would be able to get added to the assessed work a great amount of hauling done by volunteers. Especially is this so where the trouble is with sand and covering is required to make the road passable.

It seems to the writer that the first thing looking to good roads is to correct the alignment of the road, then to secure a profile of the road, giving a regular grade-and-fill line for a road that will give to the greatest number the greatest good. Make some road a sort of a trunk line through the township, as a starter. Complete that road upon fixed lines, making a profile giving the cuts and fills necessary for all time.

When one road is done, take another, and so on. In time the work will be completed and the town will be covered with good roads, and without additional cost to the taxpayer.

You will say this is all right, but how are we going to do it? I answer, by making these changes spoken of. In order to do so we must discuss the question and do it without passion or prejudice.

The other questions of good roads—what is to be done with the snow in winter? Does tree-planting along the highways improve or injure the roads by adding to the drifting of snow? If it does, what should be done? Also, what about the fencing, and how should it be constructed? are questions that come to us in this discussion.

Good roads are as necessary in one time of the year as in another—winter and summer alike. We are convinced that the sand must be covered; that the clay must be drained, and that the building of wooden bridges and culverts is no longer to be thought of.

I believe that the roads of the country can be greatly improved by a systematic effort, and an earnest and judicious expenditure of the money or time now provided for the highways.

Believing as I do that the gravest question that confronts us at the start is the one of change from the labor tax to a money tax, I ask to be heard upon that question for a short time.

We have, as before stated, in the state of Michigan something like twelve hundred millions of dollars of property that is not paying a cent toward the support of the highways of the state. This property consists of the railroads, the telegraph lines and telephones, insurance companies, and other corporations that are users of the highways or are the direct beneficiaries of the highways of the state. Why not make this vast amount of property pay its share of the burdens of maintaining the highways? But that we can not assess this property by a labor tax is conceded. We must tax it under a money tax. This money when paid in must find some one and some way to expend it. Will we do this by and through the present system of pathmasters, and permit it to be frittered away? It is estimated that a proper tax collected from the property now exempt would amount to about $250,000 per year upon the same basis as the two mill tax for schools. Will the gentleman that is to open this discussion please advise us why we should not provide a tax upon the property mentioned? All this wealth is taxed for other purposes, but not for the roads. We ask that it be charged with its just share of the public burdens. All this compels the other changes mentioned.

As to the change from the labor to a money tax, what additional burden will it impose upon the taxpayer, if he is allowed to work out the tax the same as he is doing now, with the exception that he would be required under the law proposed to give a full day's work in payment of the tax as assessed. This would change the present charge for the use of scrapers, plows, and things that are used upon the road and for which an outlandish price is received.

I ask why not make these changes, and why not create a state fund by a tax on the owner of each bicycle, and a special tax on the man who does teaming and uses the highway for a living—such as the liveryman, the peddler, and the like? Let the state collect from these people and turn the amount so received to a fund that is to be distributed to the various townships in proportion to their rights, and from these and other aids build up our highways and make them what they ought to be.

I might go into a minute description of the saving to each freeholder that would come from good roads. To figure out the increase in value of the lands adjacent to the improved highways, and the amount that a horse can draw upon a macadamized road, and how much he can draw upon the common roads of the country, and go into a long talk about the way roads ought to be rounded out and drained, and so on. But, believing that that is but a mere detail, and feeling that these and like questions have been considered by you, and that you have reached the conclusion that a good road is a good thing, I have avoided this in what little I have had to say. I ask for the question of good roads your careful thought, believing that the matter will receive at your hands that consideration which the subject demands; and when the matter of the changes mentioned is fully considered and understood, the opposition will have vanished and the work of bettering the roads will be pushed, not by us "cranks," but by the whole people; and if I can be instrumental in calling your attention to this great subject, and assisting you to its investigation, I shall feel that my coming to your meeting has been of profit. What we want, and what we mean by good roads, is a good road that connects the home and the farm with the school, the church, the postoffice, factory, and depot. Good roads mean a benefit to the masses, to those who go afoot and to those who ride. Good roads mean a more contented life on the farm, more of home and its refining influences. Good roads will bring to our aid the farmer, the cyclist, and the resident of both town and country alike. Good roads will add millions of dollars to the value of our farms, by saving millions to their owners every year. Good roads will please the pleasure-seeker, they will aid and add to the profit of the merchant, the doctor, and others; they will aid all classes.

Go you out, then, and talk, and talk good roads; agitate and talk until you reach the hearts and minds and pockets of your community. We do not expect to obtain success today, and may not tomorrow. We face the fact that it may take years of faithful, honest, and hard work to succeed. We will be accused by men who are afraid to give their names, as working for political ends. We will be called "cranks," and will be informed how to do by a lot of people who neither aid in the work nor spend a day nor a dollor in the interest of good roads. But the time is coming, and we must keep on trying, agitating, until all are with us and all are for good roads and for a money tax.

VARIOUS TOPICS.

OBJECT AND BENEFIT OF ORGANIZATION.

Mr. R. Morrill spoke upon this subject, in effect, saying:

The first object usually is to get improvement in our business for financial reasons, but I believe we ought not to think of that first. There are other and higher reasons for organizing, and the financial results will surely follow. As a rule, when a farmer is making money, he will not think of organizing, but when the times grow hard then he wishes to do so, but finds that others who buy of him have been perfecting their methods and organizations while the times were good, and that he stands a poor chance with the crude and poorly managed business that he is able to set in operation. Just now there are big efforts making, and if great care is not used the results will be the same as in the years that have passed. The first step is to do everything right, before we ask others to do right, for we can not force any revolution of honesty. Improve our method of cultivation and grow better products. If we would do this, most of our troubles would disappear. The second stage should be the improvement of the transportation facilities. This might have been accomplished long ago by careful and business-like organization. Third, the securing of better market facilities. To do this we must sink individuality and work for the common good, and not be so antagonistic. Study the methods of successful men, accepting that which is good. As a result of organizing, Grand Rapids is the best fruit market in the state of Michigan. The New York Grape Growers' union, with good business men at the head, get the Chicago market away from the St. Joe shore, and the California societies are doing the same thing. The members are required to put up their fruit on honor, and the grades run uniform. They are also good business men and carry out all agreements. A commission man lately remarked that it made no difference how much the growers might organize in Michigan, he could break any one of the organizations by sending a smooth talker among them, and one hundred dollars in cash, for they would not stick together. The immense setting of trees means that extra care and honesty must be used in packing, or our fruit will be left on our hands. This was demonstrated by the fact that the Chautauqua and Ohio brands of fruit sell better in the western markets, and bring from three to five cents better price, than Michigan fruit. Thorough organization and honest packing of fruit will do away with nearly every trouble of the Michigan fruitgrower.

CO-OPERATIVE PACKING AND SALES.

The remarks of Mr. Morrill made a deep impression upon those members who heard him, and they were in a good frame of mind to listen to the remarks of Mr. W. H. Owen of Catawba Island, O. He said:

"Our island contains about 3,000 acres of orchard and our organization was effected about ten years ago. Six years ago we conceived the idea of establishing a central packing-house, which has been in use since with much better results than formerly. The fruit is delivered between 7 a. m. and 7 p. m., is sorted by one set of packers, who work by the hour, and do not stop work for the night until the floor is cleared of fruit. Our packages are guaranteed to contain honest fruit and the same all through. We grade into four grades, which are called X, XX, XXX, and Fancy. After receiving one shipment, buyers become acquainted with the grades and telegraph for prices and understand just what they will get. This saves them the trouble and expense of coming to us to buy in person. We sell to retail grocers direct and to jobbers, look up the smaller markets and keep out of the larger ones which are usually glutted. We consign to commission men very seldom. We pack in peck, half-bushel, and bushel baskets, as fifth baskets are not wanted in the eastern markets.

We are organized with a capital stock of $10,000, but only so much of it has been paid in as is necessary for the plant and a working capital. We buy all the baskets and other supplies needed, and pay all expenses; by so doing we get cheaper transportation rates and lower prices on everything. Each member has the price set on the fruit he delivers at end of each day. The average net price received for the different grades last year was as follows: X, fifty-two cents per bushel; XX, sixty-five cents per bushel; XXX, eighty three and a half cents per bushel; Fancy, $1.12 per bushel, making the average net price received for all the grades, sixty-five cents per bushel. We insist that our members must pick their fruit and deliver it in good condition, or it is sold separate and not put in with the regular shipments. We handle berries of all kinds, also, but we do not guarantee these, as we do not put them up ourselves.

Mr. Owen received the undivided attention of those present, and many questions were given him. It was reported by Mr. Hull of Shelby that they were organized under the same system at Shelby, and Mr. Wiley remarked that there is no question but we have planted as much as we ought without arranging for a better marketing system.

MARKETING FRUIT.

Mr. D. W. Wiley of Douglas spoke on this topic. He thought there were not less than four million trees in western Michigan, producing thirty million fifth-baskets of peaches. In the same territory there had been fully as large an increase of other fruit, and with all of this increase there had been no advancement made in marketing. Our growers are located in close proximity to the greatest fruit market on earth, when natural conditions are considered, and this is Chicago and the great northwest, which must depend upon fruit from Michigan.

The question, then, for the grower to solve is, by what method can these people get their fruit without paying the profits of two or three middlemen. The growers must be united if they are to get pay for their labor. Our system now is good for the commission man but poor for the grower, and the difficulties can be overcome only by the most persistent effort. There are three ways of accomplishing this.

First—The most desirable way is to sell at the orchard or landing, which can only be done by inducing buyers to meet the growers there.

Second—By co-operation and a central bureau of information.

Third—The plan of selling fruit at auction, which is far better than our present way of consigning.

Production exceeds the requirements of the markets we are able to reach, and the idea that there is always a good demand for choice fruit is a mistaken one, as was demonstrated by experience last season.

Mr. James Brassington of Hart led in the discussion by telling of his experience last year, which was very lively in some of his dealings with the railroads in his efforts to sell direct in car-lots and not through commission men. The present season he expected to save twenty cents per bushel on the expense of shipping.

CARE IN GROWING NURSERY STOCK.

In the discussion which followed a paper on "How to grow healthy peach trees," by Mr. Alexander Hamilton of Bangor, Mr. J. F. Taylor of Douglas remarked that it was very necessary that care be used in taking buds from healthy trees, and that such trees should be marked so they could be watched the next season to see if they remained healthy. If they do, it is safe to say the stock will be healthy. While in the east he learned it was the practice of large eastern nurseries to purchase their stock of farmers who raise the trees to sell, the same as they would wheat.

FUNGOUS DISEASES OF PLANTS.

Prof. Taft of the Agricultural college gave an interesting talk, showing charts in connection that made the talk very plain and interesting. He divided fungi into two classes. First, those that grow on the outside, and second, those that grow on the inside and push out only after they have developed. For San Jose scale he recommended destroying the trees, but if the owner was determined not to do so, he could spray thoroughly with a solution composed of whale-oil soap one pound, kerosene one gallon, and five gallons water, but great care should be used to touch every scale, for one of them left would be capable of multiplying three and one-eighth billion times during one season. Trees can be cut out and destroyed without danger of spreading between October and June 1, and that really was the only way to keep it in check, as it affected all kinds of trees and berry bushes. Fruitgrowers who have purchased trees from eastern nurseries should watch their trees very closely.

MICHIGAN EXPERIMENT STATION BULLETINS.

RASPBERRIES, BLACKBERRIES AND GRAPES.

BY L. R. TAFT AND H. P. GLADDEN.

RASPBERRIES.

A few varieties of raspberry were badly killed back by the winter, but most sorts were in good condition for fruiting in the spring. Considerable anthracnose was present, but spraying with Bordeaux mixture kept the disease in check until after the berries were picked, when the old canes were removed and burned. The excessive rainfall on a soil where the quicksand closely approaches the surface, seriously injured many sorts.

NOTES ON VARIETIES.

Beckwith —Received from M. H. Beckwith, Newark, Del. The growth of cane and foliage is somewhat like Columbian, though the canes are lighter in color, with more numerous but shorter spines; the leaves are larger, coarser in texture and a darker green. Berries are large, purple, scarcely so dark as Columbian, but they are firmer and of better quality. This is the first year of fruiting and the growth was too small to judge of productiveness.

Black Diamond.—Received from C. M. Stewart & Co., Newark, N. Y. Appears to be of strong, healthy growth. The berries are large, jet black and shining, rather long conical in form and of high quality. A few fruits ripened with *Kansas*, but the main crop is a few days later. It may prove a valuable sort to come between *Kansas* and *Gregg*.

Conrath.—The cane growth was not so strong and healthy as is usual with this variety, but a fair crop of good sized berries was borne. We regard this as a valuable medium early market berry.

Columbian.—This variety suffered badly from anthracnose, and the berries were much smaller in size and produced in less quantity than in former seasons. One of the best of the purple cap class.

Farnsworth.—The canes were of good growth, stood the winter well and were quite free from disease. A very desirable sort for home use or market.

Gault.—This sort has never been of strong growth and the canes have borne but little fruit. It has never given promise of much value here.

BLACK AND HYBRID RASPBERRIES.

ABBREVIATIONS.

Size.	Form.	Color.	
s, small.	r, round.	b, black.	g, glossy.
m, medium.	c, conical.	p, purple.	l, light.
l, large.	o, ovate.	o, orange.	pu, pubescent.

Variety.	Vigor.	Date bloom.	Date first ripe fruits.	Date last fruits.	Productiveness. (1-10).	Size.	Form.	Color.	Quality.
Beckwith	9	June 17	July 19	July 31	8.8	l	r c	p	9.5
Black Diamond	9.5	" 14	" 12	" 29	8.5	l	r c	b	8.8
Caroline	9.5	" 15	" 12	" 27	8	m	r	l o	8
Conrath	8	" 12	" 12	" 28	8.5	l	r	b	8
Columbian	9	" 18	" 16	" 31	8.8	m	r o	p	8.5
Ebon Beauty	4	" 14	" 13	" 27	4	m	r c	b	7
Eureka	8	" 14	" 11	" 27	6.5	l	r c	b	7
Farnsworth	7.5	" 14	" 12	" 30	8.5	l	r	b	8.5
Gault	4	" 14	" 12	" 28	5	m	r c	b	8.5
Green	6	" 12	" 12	" 28	6.5	l	r	o pu	9
Gregg	5	" 14	" 14	" 30	8	l	r	b pu	7
Johnston	8.5	" 11	" 11	" 28	7.5	m	r	b	6
Kansas	9	" 12	" 13	" 29	9	l	r	g b	8.5
Lovett	4	" 12	" 11	" 28	6	m	r	b	8
May King	3	" 12	" 12	" 27	2	s	r c	b	7.5
Mill's No. 15	9.5	" 12	" 12	" 31	9	l	r c	b	8.5
Nemaha	4.5	" 14	" 16	" 31	8.8	l	r	b pu	7
Ohio	6	" 10	" 11	" 27	8	l	r	b	6
Older	8.5	" 13	" 12	" 30	8	l	r	b	9
Palmer	8.5	" 11	" 8	" 27	8.5	m	r	b	8.5
Progress	4	" 12	" 11	" 28	5	s	r	b	8.5
Redfield	8	" 17	" 12	" 29	8.5	m	r c	p	8
Shaffer	8	" 20	" 15	" 31	8.8	l	r s	p	8.5
Wonder	5	" 14	" 14	" 28	2	m	r c	b	8.8

Green.—Bush was of weak growth and but a small crop of fruit was borne. The berries are of good size, rather soft but of good quality. The variety was sent out as Green's New Raspberry, an objectionable name.

Gregg.—Perhaps the best late market sort. The canes are often badly injured by the winter and the variety should only be planted on a high, well-drained location.

Kansas.—This variety has been grown for several seasons and has uniformly given good results. The bush is of strong, healthy growth, and the canes are quite hardy. The berries are large, of fine appearance, though not of high quality.

Mills No. 15.—The canes are of good growth and stand the winter well. The berries are large, jet black in color, not so dry or firm as Gregg, but better in quality. In season a little earlier than Gregg. Appears to be of considerable promise.

Ohio.—While this variety usually produces a large crop, the berries are very poor in quality. It is the leading sort for evaporating purposes.

Older.—The berries are large and of high quality, but soft. As the variety is productive it is valuable for home use.

Palmer.—One of the best early market sorts.

Redfield.—Received from J. Wragg & Son, Waukee, Iowa. Canes of very strong growth, dark purple color, covered with white bloom; spines few, short. Fruits of purple cap class, smaller in size than the Shaffer and more acid in flavor. This was the first year of fruiting.

Shaffer.—This variety is quite susceptible to attacks of anthracnose. One of the best varities for canning and home use.

Ebon Beauty, *Eureka*, *Johnston*, *Lovett*, *May King*, *Progress* and *Wonder* were of weak cane growth and bore but a small crop of fruit.

RED RASPBERRIES.

ABBREVIATIONS.

Size.	Form.	Color.	
s small.	r round.	d dark.	o orange.
m medium.	c conical.	r red.	b bright.
l large.	o ovate.	p purple.	

Variety.	Vigor.	Date bloom.	Date first ripe fruits.	Date last fruits.	Productiveness.	Size.	Form.	Color.	Quality.
Brandywine	9	June 17	July 13	July 30	6	m	r	r	8.5
Cuthbert	9	" 21	" 16	" 31	9	l	r c	r	8
Golden Queen	9.2	" 17	" 15	" 31	8.5	l	r c	o	9.5
Hansell	5	" 16	" 11	" 29	7	m	r	d r	9
Kenyon	8.5	" 16	" 12	" 31	8.5	l	r c	d c	9.5
King	9	" 16	" 7	" 30	7.5	l	r c	r	8.5
Loudon	8.5	" 16	" 11	" 31	8.5	l	r c	d c	9.5
Marlboro	8.5	" 15	" 8	" 27	8.5	m	r	r	8.5
Michigan	8	" 12	" 6	" 25	8	m	r	r	9
Miller	7.5	" 16	" 14	" 31	6.5	s	r c	b r	8
Miller's Woodland	9.2	" 12	" 8	" 27	7.5	m	r	r	8.5
Perry's Golden	9	" 17	" 15	" 31	8.5	l	r c	o	9.5
Phoenix	9	" 16	" 9	" 30	8.5	l	r c	d r	9.5
Royal Church	7	" 17	" 12	" 29	5	l	r c	d c	8.5
Stayman No. 1	8	" 19	" 15	Aug. 6	7.5	l	r c	d c	9
Thompson	6	" 16	" 6	July 27	7.5	m	r	d r	9
Turner	9	" 14	" 10	" 28	8	l	c	r	9

NOTES ON VARIETIES.

Cuthbert.—Is still probably the leading market berry all points considered. *Golden Queen* and *Perry's Golden* are quite similar in bush and berry, and have a place as dessert varieties.

Hansell and *Michigan* are early and the fruits are bright in appearance and of fine quality; but *Marlboro* fruits are larger and while not of so good quality are usually produced in greater number, and the latter variety, therefore, is likely to prove more profitable as an early market sort.

Loudon.—Last year this variety ripened one week after Cuthbert; this year it was five days earlier than that sort. The canes are hardy, of good growth and productive. The fruits are large, very attractive in appearance, of high quality and firm. This variety is likely to prove a strong rival of the Cuthbert.

Kenyon appears to be identical with Loudon.

King.—Canes of good growth and healthy, but scarcely productive enough to make the variety profitable. The fruits are large, of fine color, rather dry and somewhat inclined to crumble and drop easily, seeds large. The quality is good though dry.

Miller.—Canes are not of strong growth and but a small crop of fruit was borne. The variety seems to have no points of special merit.

Phoenix.—Received from J. T. Lovett & Co., Little Silver, N. J. Not a large growth of cane, but productive for first year of fruiting. Berry very large, round conical, slightly elongated in form, rich, dark red color, and of very high quality. A variety of considerable promise.

Royal Church.—While the fruits are very attractive in appearance and of good quality, they crumble too easily to be of much commercial value.

Stayman No. 1.—This variety was scarcely so productive as last season. The canes are of stout, upright growth, and do not make enough laterals to bear a large crop of fruit. The berries are large, dark color and of good quality. The variety is very late to ripen and would be valuable to furnish a succession.

Turner.—Is valuable where a very hardy sort is required.

All Summer, *Henrietta*, *Herstine*, *Rivers Yellow* and *Yellow Antwerp* were killed to the ground and bore no fruit.

SUMMARY.

The following varieties of raspberries are the most reliable or promising for central Michigan.

BLACK CAPS.

Palmer for early. *Conrath* and *Kansas* for medium season, and *Gregg* for late. *Older* is excellent for home use. *Black Diamond* and *Mills No. 15*, are very promising.

PURPLE CAPS.

Shaffer and *Columbian* have given good satisfaction while *Beckwith* and *Redfield* are promising new sorts.

RED VARIETIES.

Cuthbert is still the leading variety of this class planted, though the newer sort, *Loudon*, appears superior in some respects. *Marlboro* and *Hansell* have a place as early sorts. *Phoenix* is a promising new variety and *Stayman No. 1* possesses the merit of ripening the bulk of the crop late.

BLACKBERRIES.

A few blackberries were quite severely injured by the winter, but most sorts were in good condition after cutting back in the spring, to bear a large crop of fruit. The frequent rains in July and August prevented the usual drouth occurring during that period and the blackberry crop was one of the largest and best ever grown here.

BLACKBERRIES.

Name.	Vigor.	Date bloom.	Date first ripe fruits.	Date last fruits.	Productiveness.	Weight of berry in ounces.	Quality.
Agawam	7	June 11	July 24	August 27	7.5	1-18	8
Early Cluster	9.5	" 11	" 24	" 27	6.5	1-15	6.5
Early Harvest	8	" 18	" 23	" 23	3	1-18	8.5
Early King	9.8	" 17	" 16	" 6	8.5	1-9	8.5
Early Mammoth	8.5	" 21	" 31	" 26	4	1-6	8
Eldorado	9.8	" 19	" 27	September 4	10	1-12	9
Erie	9.5	" 12	" 26	August 28	8	1-14	7.5
Ford No 1	8	" 19	" 29	" 28	7.5	1-9	7
Jewett	9.5	" 16	" 27	" 30	6.5	1-9	8.5
Kittatinny	9.8	" 18	" 29	September 3	7.5	1-12	8
Lincoln	9.7	" 12	" 30	" 5	9.5	1-12	6.5
Lovett	9.5	" 18	" 30	August 27	8	1-12	6
Minnewaski	9.8	" 11	" 26	" 27	7.5	1-18	7
Ohmer	8	" 21	" 29	" 30	2	1-9	8.5
Snyder	9.8	" 10	" 29	September 4	10	1-12	9
Stone's Hardy	9.8	" 10	" 28	" 3	8	1-12	8.5
Taylor	9.8	" 12	" 29	" 4	9.5	1-12	9
Wachusett	8.6	" 15	" 28	August 30	7	1-18	8.5
Wilson Jr.	9.4	" 12	" 27	" 24	8	1-12	7.5

NOTES ON VARIETIES.

Early Harvest is early and the fruits though small are of good quality. The canes, however, are so lacking in hardiness that the variety is poorly adapted to this section, unless the canes are laid down in winter.

Early King.—The canes are of strong, vigorous, upright growth, and productive. The fruits are large, of good quality and soft when ripe As the variety is early, it is well worthy of extensive trial. In 1896-7 it badly winter killed.

Early Mammoth.—Canes are of good growth, rather spreading and quite thorny. Fruits are large, long conical and of good quality. This was the first year of fruiting and the fruits were borne on long stems two to three inches long, and scattered singly all along the branch. As the berries were not in clusters, but few were produced. Perhaps the character of fruit-bearing may change when the plants are older.

Eldorado.—The cane growth is of the same general habit as the *Snyder*, though the leaflets are smaller, longer and narrower; the spines are scarcely so long or sharp and the older canes have more of a reddish tinge. The fruits are quite similar in appearance and quality. The past season *Eldorado* ripened a little earlier than the *Snyder*.

Lincoln.—Canes of strong growth, usually light green with slight reddish tinge; spines long and sharp; leaflets large. A few fruits are large, round conical and have very large seeds. The great majority of the fruits are small and imperfectly formed, and drop very easily before fully ripe. A very productive variety, but the fruits are small and poor in quality.

Ohmer.—Bore its first fruits this year and requires further trial.

Snyder and *Taylor* are old and well tried sorts that can usually be relied upon to produce good crops of fruit.

Agawam, Early Cluster, Erie, Ford No. 1, Jewett, Kittatinny, Lovett, Minnewaski, Stone's Hardy, Wachusett and Wilson Jr., while possessing some good qualities, are either lacking in hardiness, are unproductive, or the fruits are too small to sell well in market.

Childs' Everbearing and *White Blackberry* were killed nearly to the ground and no fruit was borne.

GRAPES.

The season of 1897 was very favorable for the grape and nearly all varieties of bearing age gave promise of a large crop of fruit. Owing however, to the numerous depredations committed, it was impossible to get full notes on the time of ripening, quality and productiveness of all sorts grown. A table of varieties is therefore omitted and the following brief notes given.

Berckmans.—The vine was productive, and the clusters, while not large are of good form and compact. The grapes are medium in size, round and a light purplish red color. The berries hang well to stem but are of medium quality. Season with *Concord.*

Brighton.—This is one of the leading red grapes for home use or market. The canes are productive and the fruit and foliage usually quite free from disease.

Chidester No. 4.—Much like *Concord* but a little later in season and the grapes larger. A variety of much promise.

Delaware.—An old sort somewhat liable to mildew but the quality is so superior that the variety should have a place in every home vineyard. Season a week later than *Concord.*

Diamond.—The variety is hardy and productive. Clusters large and compact. The grapes are good size, yellowish green color and of good quality. Season a week earlier than *Concord.* A good sort for the home plantation.

Early Victor.—The canes are of good growth, healthy and productive. The bunches are not large and the grapes are of medium size, blue-black in color and of good quality. The variety is about two weeks earlier than *Concord*, and is worthy of a place in the home vineyard.

Empire State. One of the leading white market grapes. It is not so large in bunch or berry as *Niagara*, but is better in quality.

Geneva.—Healthy and productive. The bunch is of medium size but good form. Berry medium to large, light green in color and of good quality. In season a little earlier than *Concord.* Worthy of trial as a home grape.

Hayes.—The clusters are of medium size, quite close and compact. The berries are a rich golden yellow color and very good in quality. Lacking in productiveness, otherwise a fine table sort.

Janesville.—Healthy and productive. Clusters small and compact. Berry of medium size, black and of fine quality. Too small in bunch and berry to be a profitable sort. It is two or three weeks earlier than *Concord.*

Moore Early.—The variety most largely grown as an early market grape. Season two weeks earlier than *Concord.* The variety is moderately productive; the clusters are of medium size, and the grapes are large, but the quality is rather low.

Niagara.—The leading white market grape. It is vigorous in growth, healthy and productive. The clusters and berries are large and the quality good. It is a little later than *Concord.*

Pocklington.—An excellent yellowish-white grape; a little earlier in season than *Niagara* and the clusters and berries are smaller in size. The quality is better than that of *Niagara*, except that the flavor is quite foxy.

Rockwood.—Clusters small and quite compact. Berries of medium size, blue-black color and of good quality. It is two weeks earlier than *Concord* and has a place in a small way because of its earliness and quality.

Vergennes.—The growth is vigorous and healthy in foliage and fruit. Clusters of good size and compact in form. Berry large; color dark purple with green markings; quality good. The season is a little later than *Concord.* It is a valuable variety because of its good keeping qualities.

Winchell.—The variety is healthy in fruit and foliage. Clusters of good size and compact in form. Berry of medium size, round, color light green, skin thin but firm, pulp sweet, melting and of very fine quality. The variety is fairly productive and two to three weeks earlier than *Concord.* Valuable for home use and of considerable promise as an early market grape.

Worden.—This variety is from a week to ten days earlier than *Concord*, fully as productive and better in quality. This sort should be in every vineyard whether planted for home use or market.

Munson's No. 2, No. 32, No. 38 and No. 61 have been grown for several seasons. The vines are very productive, but the clusters are small, the grapes *very* small, sour and quite late to ripen. The varieties are subject to Phylloxera and have little value in this section.

L. R. TAFT,
H. P. GLADDEN.

AGRICULTURAL COLLEGE, MICH.,
December 1, 1897.

REPORT OF SOUTH HAVEN SUB-STATION.

Prof. L. R. Taft, Horticulturist:

SIR – In submitting the following report of operations at this sub-station, during the portion of the year 1897 already elapsed, I take occasion to state that, owing doubtless to the exhaustion consequent upon the excessive crop of last year, together with the unusually prevalent low temperatures of the past spring, the fruit crop at this sub-station has, in very many cases, failed to fulfil even its early promise.

Snow fell here, in considerable quantity, as late as April 20, disappearing very slowly, the mercury ranging as low as 21° on the morning of the 21st. The weather continued cold, dry and otherwise unfavorable most of the time, till near the middle of June, at about which time the first copious rains occurred.

A careful examination by yourself, in March last, having betrayed the presence of San Jose scale upon a couple of small pear trees, planted in the spring of 1896, they were at once treated, under your direction, with an application of undiluted kerosene, which effectually exterminated the pest with no apparent injury to the tree-growth, which, at the time, was entirely dormant.

Your examinations at that time also betrayed a considerable prevalence of the Putnam scale. This was, therefore, at once treated with a thorough application of an emulsion of kerosene and whale oil soap, under your direction and supervision, which proved very effective.

In this report, as in preceding ones, the rules of Pomology of the American Pomological Society, which are also adopted by the National Division of Pomology, are as far as practicable applied to the names of the fruits reported.

In applying the spirit as well as the letter of these rules, we are antagonized by several more or less objectionable practices, now common among the originators and introducers of new varieties, and which too frequently prove sources of error in nomenclature, with multiplication of synonyms, and occasionally of objectionable prolixity in names.

Among these we note the following:

1. The disseminating of varieties under numbers, or under the originator's name, with a number attached, which, when permanently named, too frequently becomes the occasion, if not of error, at least of a multiplication of synonyms.

2. The use of coarse, rowdyish, pretentious or sensational names not unfrequently applied with the apparent purpose of promoting sales, with no apparent regard to actual value.

3. The application of specific titles to mere varieties, as in the case of Prunus Pissardi plum.

4. The yet more recent practice of combining the names of two varieties, or even species, and applying such compound name to a variety, notable

cases of which occur in Bartlett-Seckel and Worden-Seckel pears, which are paralleled in the name, Dana Hovey, applied to a fine pear; coupling the name of the originator with that of a noted pomologist, long since deceased.

So seriously objectionable are each and all these practices, that it becomes highly important that they, by some means, be promptly and effectively checked.

The rules, as well as the practice, of both the Society and the Division, accord to the originator the prior right to name his origination; but, at the same time, reserve the right to insist that such name shall be in accordance with the rules.

It is understood to be the practice of the National Division of Pomology to require compliance with such rules, before accepting a new fruit for entry upon its records.

Important and effective as such action unquestionably is, it can be but partially successful without the coöperation of other and similar influences.

It is perhaps too much to expect that the catalogues and horticultural serials of the day can be, to any considerable extent, induced to adopt the practice indicated, but a concurrent refusal by the Experiment Stations of the day, to give publicity to new varieties, until named in compliance with the prescribed rule, coupled with the known practice of the Division of Pomology, could scarcely fail to insure a very general acceptance and adoption of the desired practice.

STRAWBERRIES *Fragaria*

The Station grounds are now so densely planted with fruit trees, that the last three plantings of strawberries have unavoidedly been made upon ground partially or wholly preoccupied by fruit trees; more or less of them of bearing age.

Under such conditions, it is assumed that the weight or bulk of the crop cannot fairly express the value of a variety, as compared with others grown under more favorable conditions. For this reason the vigor and productiveness of varieties, as compared with others grown under similar conditions, are estimated upon the scale—1 to 10.

A straw mulch was applied late last autumn, for winter protection, and the plants were sprayed last spring, after removing the mulch, as a preventive against the depredations of insects and fungi, from which, however, the plantations have been notably exempt; the chief exception being the minute larva, commonly known as the *midge*, which, however, yielded to an application of tobacco water, which was applied June 5th. In the last spring's plantation, also a considerable number of plants were destroyed by the grub (*Lachnosterna fusca*), and were at once replaced.

The very warm, dry weather of late June and early July rapidly deteriorated the remainder of the strawberry crop, so that the last picking was made on July 6th, when the one and two year plats (the latter having been fruited the second year for the purpose of comparison), were at once plowed under.

The ground from which the old small fruit plat had been recently removed should doubtless have been liberally manured, and cultivated at least a year before being replanted. But this being the only available ground for the purpose, it was prepared and planted with strawberries last spring, after receiving a light application of unleached ashes—all that could be obtained for the purpose, at the time, and chemical fertilizers.

The weather continuing very warm and dry, on July 19th to 23d, the plat was irrigated from the village water mains by means of a hose, and again on the 28th to 31st.

Taken as a whole, the season can scarcely be considered a favorable one for the strawberry, though a timely rain during the earlier part of the ripening season would probably have added largely to the yield.

Of the numerous varieties of strawberries now before the public, few if any have been carefully described, either by the originators or introducers. Under such circumstances, the receiver of a, to him, unknown novelty, must necessarily depend implicitly upon the correctness and veracity of the person from whom he receives it, so far as its genuineness is concerned. Indeed, so readily is the public accustomed to accept alleged novelties that, in very many cases, the same description would suffice, almost equally well, for a very considerable number of varieties.

It is suggested, that a large expenditure upon worthless novelties would be saved, were the public to require that novelties shall only be accepted upon a description, showing superior and valuable qualities.

As a step toward the accomplishment of this object, the descriptions of both plant and fruit, in the following tabulation, are made as full and minute as practicable, within the space that can be devoted to such purpose, the estimates being made upon the scale—1 to 10, with 10 as the maximum.

Tabulation of Strawberries, 1897.

Abbreviations: b, bi-sexual; n, nearly; p, pistillate; c, conical; co, compressed; i, irregular; l, long; o, oblate; ob, oblong; r, round; b, bright; c, crimson; d, dark; l, light; s, scarlet. Scale: 1 to 10; 1, feeble; 10, very vigorous.

No.	Names.	Plant.						Fruit.					Remarks.
		Sex.	Vigor. (1-10)	Date of Bloom.	Date of first picking.	Date of last picking.	Product.	Form.	Color.	Quality. (1-10)	Texture. (1-10)	Weight. Ounces.	
1	Acem	b	9	May 12	June 15	July 6	5	r c	l s	5	6-7	¼	Strong, upright.
2	Afton	p	7	" 17	" 24	" 2	8	r o co	c	6-7	8	¼	Tall, upright, rather weak.
3	Allen	b	6	" 12	" 19	" 6	9	ob	c	7	6	⅔	Low, spreading, rather weak.
4	Allen, 5	p	6	" 17	" 17	" 2	4	r c i	c	8	7	¼	Low, spreading, strong.
5	Allen, 6	p	7	" 17	" 24	" 2	5	r o	c	5-6	5	⅓	Upright, spreading, strong.
6	Allen, 13	p	7	" 18	" 22	" 2	8	t c	c	8-9	8	⅓	Low, spreading, weak.
7	Annie Laurie	b	5	" 21	" 26	" 6	4	r o	c	6-7	10	⅓	Low, spreading, weak.
8	Aroma	b	7	" 18	" 21	" 6	9	r c i	c	3-4	4-5	⅓	Tall, spreading, strong.
9	Arrow	p	8	" 18	" 25	" 6	4	r c	d s	3-4	4	½	Tall, upright, strong.
10	Auburn	p	6	" 18	" 24	" 2	6	r c	c	7-8	9-10	¼	Tall, upright, weak.
11	Banquet	p	4	" 14	" 22	" 6	4	r c	d s	6-7	7-8	1-6	Tall, upright, weak.
12	Barton	p	5	" 13	" 24	" 6	7	c co i	d s	4-5	7	¼	Tall, upright, strong.
13	Beebe	b	6	" 17	" 26	" 2	6	r c co	l c	3-4	4	⅓	Tall, upright, strong.
14	Beecher	b	10	" 18	" 22	" 6	9	r ob	c	4-5	4	½	Low, spreading, strong.
15	Belt, 3 (Wm. Belt)	b	8	" 15	" 22	" 6	9	c	s	4-5	6	½	Tall, spreading, strong.
16	Beverly	b	7	" 18	" 22	" 6	10	r c i	b s	6-7	8	½	Low, strong, spreading.
17	Bickle	p	5	" 16	" 22	" 6	4	r c	s	4-5	7	1-5	Low, weak, spreading.
18	Boynton	p	10	" 17	" 22	" 6	9	r c i	s	6-7	7	1-6	Tall, upright, weak.
19	Brandywine	p	10	" 18	" 22	" 6	10	r c o	c	4-5	9	½	Low, spreading, strong.
20	Brunette	b	8	" 17	" 22	" 6	8	r c o	d c	9-10	9	⅓	Tall, spreading, strong.
21	Bubach, 5	p	9	" 18	" 24	" 6	7	r c co i	s	4-5	4	½	Tall, strong, upright.
22	Cameron, 2	b	6	" 13	" 17	" 2	6	r c co	s	6-7	6	⅓	Tall, upright, strong.
23	Cameron, 6	b	6	" 17	" 17	" 2	3	r c	c	3	6	¼	Tall, upright, strong.
24	Cameron, 13	p	6	" 19	" 26	" 2	7	r o c	s	4-5	8	⅓	Tall, upright, strong.
25	Carrie	p	7	" 19	" 26	" 6	5	r c co	s	3-4	5	½	Tall, upright, strong.
26	Chairs	p	7	" 17	" 17	" 6	6	r c i	s	5	4	¼	Tall, upright, strong.
27	Champion (Eng.)	b	9	" 19	" 28	" 6	10	r c co i	s	3-4	6-7	½	Low, spreading, rather weak.
28	Charlie	p	10	" 17	" 22	" 6	8	r c	s	4-5	8	¼	Tall, upright, rather strong.
29	Cheyenne	p	7	" 19	" 26	" 6	6	r c co i	s	6-7	5	⅓	Low, spreading, weak.
30	Clark	b	6	" 17	" 22	" 2	5	r c	c	6-7	8	⅓	Low, spreading, weak.
31	Cleveland	p	7	" 18	" 22	" 6	7	r c co	s	4-5	5	⅓	Low, spreading, strong.
32	Columbia	b	6	" 19	" 22	" 6	10	l c i	s	4-5	4	½	Low, spreading, rather weak.
32	Consensus	p	7	" 20	" 26	" 6	8	r o c co	c	8-9	8	⅓	Tall, upright, strong.
34	Copernicus	p	8	" 19	" 22	" 6	5	r c i	c	4-5	8	⅓	Tall, upright, strong.
35	Crescent	p	9	" 17	" 22	" 6	9	r c i	s	4-5	4-5	¼	Tall, upright, strong.
36	Cruse	b	7	" 17	" 22	" 6	7	r c co	l c	5	9	⅙	Low, spreading, strong.

37	Curtis, 15	b	7	" 17	" 18	" 6	6	r c co	s	5	6	½	Tall, upright, strong.
38	Curtis, 159	p	7	" 17	" 22	" 6	8	ob co	s	5	8	½	Tall, upright, strong.
39	Cyclone	b	6	" 15	" 21	" 2	5	c co i	c	8	7	⅓	Tall, upright, strong.
40	Daisy	p	6	" 21	" 24	" 6	4	r c co	d s	-7	8	¼	Tall, upright, weak.
41	Dan Bisel	b	10	" 14	" 21	" 6	10	r c co	d s	8	8	⅓	Tall, upright, strong.
42	Dayton	b	9	" 18	" 14	" 6	9	c i	d s	6-7	4 5	⅓	Low, spreading, strong.
43	Earliest	b	9	" 12	" 15	" 6	6	r c co	s	6 7	10	¼	Tall, upright, strong.
44	Early Jack	b	8	" 15	" 22	" 6	7	r co i	s	4 5	5	¼	Tall, upright, weak.
45	Edgar	p	7	" 17	" 23	" 6	9	r c i	d s	3 4	4	⅓	Low, upright, strong.
46	Edith	p	6	" 21	" 28	" 6	6	r c co	c	8 9	7	½	Low, spreading, strong.
47	Edward (Fav.)	b	6	" 19	" 26	" 6	7	r c	d s	6-7	7	⅓	Short, spreading, weak.
48	Edwards	b	6	" 13	" 23	" 6	8	r c i	l s	5	5	⅓	Low, spreading, weak.
49	Eleanor	b	8	" 18	" 20	" 6	8	r c i	c	6-7	8	¼	Low, spreading, strong.
50	Enhance	b	6	" 17	" 23	" 6	7	c i	c	9	10	⅓	Tall, upright, weak.
51	Epping	p	7	" 12	" 15	" 6	4	c co i	s	3 4	3	⅓	Tall, spreading, strong.
52	Fairmount	b	8	" 17	" 18	" 6	10	r c co	c	7 8	6	¼	Tall, upright, weak.
53	Feicht, 2	b	7	" 13	" 23	" 2	5	r c i	s	5	8	⅓	Low, upright, strong.
54	Feicht, 3	p	7	" 18	" 26	" 6	6	c i	c	3-4	3	¼	Tall, spreading, strong.
55	Fir	b	6	" 19	" 23	" 2	8	r c	s	6 7	8	⅓	Low, spreading.
56	Gardner	b	7	" 18	" 23	" 2	6	o c	c	4 5	6	½	Tall, upright, strong.
57	Gipsy	p	8	" 18	" 24	" 6	6	c i	c	9-10	9	⅓	Low, upright, strong.
58	Glenfield	b	5	" 15	" 23	" 2	8	r c	c	6 7	8	¼	Low, spreading, weak.
59	Greenville	p	10	" 17	" 23	" 6	9	r c co	c	3 4	4-5	¾	Tall, upright, spreading.
60	Harmon	b	8	" 14	" 14	June 28	4	c	c	9-10	8	⅓	Tall, upright, strong.
61	Hattie	p	7	" 17	" 23	July 6	7	r c i	s	3 4	4	¼	Tall, upright, spreading, strong.
62	Haverland	p	8	" 13	" 23	" 6	7	ob c co	s	8-9	7-8	⅓	Tall, upright, strong.
63	Hermit	b	8	" 17	" 23	" 6	8	r c i	s	5-6	7	⅓	Tall, upright, strong.
64	Holland	p	9	" 21	" 25	" 6	5	r c co	s	3-4	4	⅓	Tall, upright, strong.
65	Hugo	b	4	" 18	" 23	" 2	4	r c i	c	5	8	½	Low, spreading, weak.
66	Huntsman	b	6	" 19	" 24	" 2	5	r	c	6-7	9-10	⅓	Low, spreading, strong.
67	Hyslop	b	7	" 13	" 14	June 28	5	r c	d s	6 7	5-6	⅓	Tall, upright, strong.
68	Iowa	b	2	" 15	" 23	" 28	3	r ob co	c	4-5	5	⅓	Low, spreading, strong.
69	Irene	p	7	" 21	" 23	July 6	10	c co i	c	6-7	8	⅓	Low, spreading, strong.
70	Isabel	n, p	9	" 20	" 19	" 6	10	c co i	c	6	9	¾	Tall, upright, weak.
71	J. S., 4	p	8	" 17	" 23	" 6	9	r c co	s	5-6	4	⅓	Tall, upright, rather weak.
72	J. S., 6	p	5	" 17	" 25	" 6	8	r c	s	7-8	7	¼	Low, spreading, weak.
73	Kansas	b	6	" 17	" 23	" 2	7	r c	s	5 6	7	⅓	Tall, upright, weak.
74	Katie	b	8	" 18	" 23	" 6	10	r co	s	3-4	8	⅓	Tall, upright, strong.
75	Klickita	p	7	" 19	" 25	" 6	6	r c	s	7	5	1-5	Upright, tall, strong.
76	Kossuth	b	6	" 15	" 23	" 2	10	r c i	c	5	4-5	¼	Low, spreading, weak.
77	Kyle, 1	b	10	" 18	" 24	" 6	8	r c o	s	4-5	4	⅓	Tall, upright, strong.
78	La Crosse	n, p	6	" 19	" 25	" 6	6	r c	s	4-5	7	1-5	Tall, upright, strong.
79	Leader	b	7	" 15	" 25	" 2	4	r c	c	7 8	9	½	Low, spreading, strong.
80	Lehigh	p	7	" 17	" 23	" 6	7	c i	d s	5-6	7	1-5	Tall, upright, strong.
81	Leroy	p	8	" 17	" 23	" 2	8	r c	c	6-7	5	⅓	Tall, upright, strong.
82	Leviathan	b	5	" 19	" 23	" 2	7	c co	s	4-5	4	½	Low, spreading, strong.

Tabulation of Strawberries, 1897.—Continued.

No.	Names.	Plant.						Fruit.					Remarks.
		Sex.	Vigor. (1-10)	Date of Bloom.	Date of first Picking.	Date of last picking.	Product.	Form.	Color.	Quality. (1-10)	Texture (1-10)	Weight. Ounces.	
83	Lincoln	p	8	May 18	June 23	July 6	9	c i	s	5-6	5	⅓	Tall, upright, strong.
84	Little, 26	b	10	" 19	" 28	" 6	10	r co	c	7-8	7-8	⅓	Tall, upright, strong.
85	Little, 42	n, p	7	" 17	" 23	" 6	8	i co	c	7-8	7-8	⅓	Short, spreading, strong.
86	Longfield	p	8	" 17	" 19	" 6	8	r c	c	7	8	⅓	Tall, upright, strong.
87	Lovett	b	7	" 18	" 19	" 6	10	c co i	c	7-8	8	⅓	Short, upright, rather weak.
88	Lower	b	7	" 17	" 25	" 6	7	r c co	c	4-5	8	½	Tall, upright, spreading, strong.
89	Magnate	p	8	" 18	" 23	" 6	6	l c co	s	5-6	7	⅓	Tall, upright, strong.
90	Marshall	b	8	" 15	" 24	" 6	8	c co i	c	5-6	8	⅔	Tall, upright, strong.
91	Mary	p	6	" 19	" 25	" 6	5	r c	d c	5-6	6-7	½	Tall, upright, strong.
92	Maxwell	b	5	" 15	" 23	" 6	4	r c	d s	4-5	6	⅓	Tall, upright, strong.
93	Mayflower	b	8	" 10	" 24	June 30	7	r c	s	6-7	6-7	¼	Tall, upright, rather weak.
94	Meeks	b	7	" 13	" 23	June 28	5	o c co	c	4-5	8	¼	Tall, spreading, strong.
95	Miller	b	8	" 22	" 25	July 6	9	r c	c	5-6	8	⅓	Tall, upright, strong.
96	Murray	p	6	" 12	" 22	" 6	5	r c co	s	4-5	8	¼	Tall, upright, weak.
97	Muskingum	b	10	" 21	" 23	" 6	10	c co	c	7-8	8	½	Tall, strong, slightly spreading.
98	Mystic	b	7	" 20	" 25	" 6	10	r c co	d s	3-4	8	½	Low, spreading, strong.
99	Noble	b	2	" 13	" 25	June 30	1	r c	s	2-3	4	⅓	Low, spreading, strong.
100	No. 31	b	7	" 19	" 24	" 30	7	r c co	c	9-10	9	⅓	Tall, spreading, upright, strong.
101	Odessa	p	8	" 18	" 28	July 6	6	r c co	d s	4-5	8	⅓	Tall, upright, strong.
102	Ohio Centennial	b	7	" 17	" 25	" 6	8	r c i	d s	3-4	4	¼	Low, spreading, strong.
103	Ona	p	8	" 18	" 23	" 6	7	r c	s	5-6	7	⅓	Tall, upright, strong.
104	Orange Co.	p	8	" 17	" 22	" 6	6	r	c	5-6	6	⅓	Tall, upright, strong.
105	Oregon 273	b	5	" 17	" 23	" 6	6	r c co	s	4-5	7	⅓	Low, spreading, weak.
106	Orono	p	7	" 17	" 24	" 6	4	i co	c	6-7	5	½	Tall, upright, weak.
107	Oscar	b	5	" 20	" 26	" 6	5	r c co	c	8-9	8	⅓	Low, spreading, strong.
108	Ostego	p	8	" 17	" 26	" 6	5	r	s	4-5	6	1-5	Tall, upright, spreading, strong.
109	Pacific	p	8	" 17	" 23	" 2	7	r c i	s	5-6	5	½	Tall, upright, strong.
110	Paris (King)	b	8	" 17	" 18	" 6	8	r c co	l s	6	8	⅓	Low, spreading, weak.
111	Parker Earle	b	8	" 17	" 25	" 6	10	r c co	d s	4-5	5	½	Tall, upright, strong.
112	Pawnee	p	7	" 17	" 23	" 2	8	r c co	l c	6-7	8	½	Tall, upright, spreading, strong.
113	Philip	b	9	" 17	" 23	" 2	10	r c i	c	5-6	8	½	Tall, upright, strong.
114	Phippen	b	8	" 17	" 21	" 6	5	r c i	c	6-7	9	1-6	Tall, upright, rather weak.
115	Plow City	b	5	" 18	" 26	" 2	3	----------	s	3-4	8	¼	Tall, upright, strong.
116	Premium	b	7	" 19	" 28	June 29	1	----------	s	----------	8	----------	----------
117	Price	b	8	" 13	" 23	July 2	10	r c co	s	4-5	10	⅓	Tall, upright, strong.
118	Primate	b	8	" 13	" 23	" 2	7	r c	c	8-9	7	⅓	Short, upright, strong.
119	Princess	p	8	" 12	" 23	" 6	4	r c co	s	4-5	4	⅓	Tall, upright, spreading, strong.
120	Princeton	b	9	" 12	" 25	" 6	5	r c	s	3-4	5	¼	Tall, upright, strong.

121	Richmond	b	6	" 13	" 23	" 6	9	c co i	d c	7-8	9	⅓	Low, spreading, weak.
122	Rio	b	7	" 10	" 23	" 2	9	r c	s	7-8	9	⅓	Tall, upright, strong.
123	Robinson	b	9	" 17	" 25	" 6	9	r c co	s	7-8	9	1-5	Tall, upright, strong.
124	Ruby	b	8	" 12	" 23	" 6	9	r c co	c	5-6	9	½	Tall, upright, strong.
125	Sandoval	b	5	" 17	" 23	" 6	6	c co	d c	8-9	8	⅓	Low, spreading, weak.
126	Saunders	b	10	" 17	" 23	" 6	10	r c co	c	10	10	¼	Tall, spreading, strong.
127	Scarlet Ball	p	10	" 13	" 28	" 6	6	r i	s	6-7	7	⅓	Tall, upright, strong.
128	Sharpless	b	9	" 18	" 23	" 6	8	c co i	c	8-9	5	⅓	Tall, spreading, strong.
129	Shawnee	b, p	10	" 15	" 23	" 6	9	r c	d s	4-5	5	½	Low, spreading, strong.
130	Sherman	b	9	" 13	" 22	" 6	10	r	l s	5-6	9	⅓	Tall, spreading, strong.
131	Shuckless	b	8	" 17	" 23	" 6	7	r c i	c	5-6	7	¼	Tall, upright, spreading, strong.
132	Smalley	p	9	" 16	" 23	" 6	10	r c i	s	3-4	7	⅓	Tall, upright, strong.
133	Smeltzer	b	6	" 12	" 23	June 29	7	r c	c	8	7	⅓	Tall, upright, strong.
134	Smith	b	9	" 10	" 23	July 2	8	r c i co	s	3-4	4	⅓	Tall, upright, strong.
135	Snowball	b	10	" 17	" 19	" 6	7	r c	s	4-5	8	⅓	Tall, upright, strong.
136	Southard	b	8	" 12	" 23	" 2	5	r i	s	7-8	7	⅓	Low, spreading, weak.
137	Speece	p	6	" 17	" 23	" 2	6	r c i	c	5-6	6	½	Low, spreading, strong.
138	Splendid	b	8	" 15	" 23	" 6	8	r c	s	3-4	3	½	Tall, spreading, strong.
139	Springdale	b	7	" 18	" 25	" 6	10	l c	c	5-6	8	½	Low, spreading, strong.
140	Stahelin	p	9	" 10	" 23	" 2	6	c i	l c	5	5	½	Tall, upright, spreading, strong.
141	Standard	b	10	" 15	" 23	" 6	9	r c	s	2-3	6	⅓	Low, spreading, strong.
142	Staples	b	9	" 17	" 18	" 6	7	r c i	d c	7-8	7-8	¼	Low, spreading, strong.
143	Stewart	b	10	" 10	" 15	" 6	6	r c co	s	5	9	¼	Tall, upright, strong
144	Sunnyside	p	10	" 17	" 22	" 6	6	r c	s	2-3	3	⅓	Tall, upright, spreading, strong.
145	Surprise	b	8	" 17	" 25	" 6	6	r c	c	3-4	6	½	Tall, upright, strong.
146	Swindle	p	10	" 17	" 25	" 6	7	r c	s	4-5	8	⅓	Tall, upright, strong.
147	Tennessee	b	7	" 15	" 23	" 6	6	r c	c	7	6	⅓	Tall, upright, strong.
148	Thompson 40	p	9	" 17	" 25	" 6	5	r c	s	4-5	6	⅓	Tall, upright, strong.
149	Thompson 66	p	8	" 19	" 25	" 6	4	r	c	4-5	7	1-6	Tall, upright, rather weak.
150	Timbrel	p	6	" 20	" 25	" 6	7	c i	c	8	8	⅓	Tall, upright, strong.
151	Tom Walker	p	9	" 15	" 25	" 6	7	r c	c	4-5	6	¼	Tall, upright, weak.
152	Tonga	p	8	" 12	" 25	" 6	6	r c	c	7-8	7	⅓	Rather low, upright, strong.
153	Topeka	b	8	" 15	" 23	" 6	8	l c co	d s	4-5	8	¼	Tall, upright, strong.
154	Tubbs	b	8	" 13	" 29	June 30	5	r c	d s	4-5	4	⅓	Tall, upright, strong.
155	Van Deman	b	8	" 10	" 19	July 6	10	c i	c	10	8	½	Tall, upright, strong.
156	Warfield	p	8	" 17	" 25	" 6	9	c co	c	6-7	6	¼	Tall, upright, rather weak
157	Welton	b	8	" 17	" 26	" 6	7	r c	d s	2-3	4	¼	Low, spreading, strong.
158	Weston	p	7	" 17	" 26	" 6	8	r c	c	3-4	8	⅓	Tall, upright, rather weak.
159	Williams	b	10	" 20	" 23	" 6	10	r c co	c	9-10	9-10	½	Low, spreading.
160	Wilson	b	9	" 17	" 23	" 6	10	r c	s	5-6	9	¼	Low, spreading, strong.
161	Wood (Beder)	b	9	" 17	" 25	" 6	10	r c	s	3-4	4-5	⅓	Tall, rather spreading, strong.
162	Woolverton	b	9	" 20	" 23	" 6	10	r c	c	9	9	½	Low, spreading, strong.
163	Wyatt	b	7	" 17	" 22	" 6	6	r c	c	5-6	8	⅓	Tall, upright, strong.

The dates of the blooming and ripening of strawberries, as has been already stated, have been unusually modified by climatic causes. While occasional varieties struggled into bloom during the unusually cool weather of early May, the sudden advent of very warm weather soon after, forced the delayed varieties into bloom almost in a mass.

The ripening season also, though dry, continued cool till near the end of June, when, though still dry, it suddenly became very warm, with the effect that much of the yet unripe fruit was dried upon the vines, thus bringing the picking season to a premature close. The estimates of productiveness, under these conditions, are to be understood as essentially a comparison of results, between the varieties tabulated during the current season.

Of the varieties betraying lack of vigor, sixteen are pistillate or nearly so, and the remaining twenty-one are bisexual, thus giving a slight preponderance to the popular assumption, that the non-production of pollen conserves the vigor, or ultimates in increased productiveness.

Of the 163 varieties tabulated, 124 rank above medium, so far as productiveness is concerned, while only 37 equal or exceed the old Wilson in quality, when grown under the same conditions.

The tabulation includes forty-five varieties graded as high as nine for productiveness, while of these four only rank as high as nine in quality, with five others in the tabulation, of equal quality, but more or less deficient in productiveness—a not very creditable comment upon the greed of buyers and consumers for size and quantity, in disregard of quality, as well as on the strife of growers for present returns, in disregard of ultimate reputation and profit.

Owing, apparently, to exceptional climatic influences, a considerable number of varieties which have been for a considerable time on trial without specially favorable results, have this season been unusually productive.

The following is an abstract of the grading for quality of those ranking nine to ten for productiveness:

2 to 3—Standard.

3 to 4—Aroma, Champion (Eng.), Edgar, Greenvillle, Katie, Mystic, Smalley and Wood (Beder).

4 to 5—Beecher, Belt 3, Brandywine, Columbia, Crescent, Parker Earle, Price and Shawnee.

5—Kossuth.

5 to 6—J. S. 4, Lincoln, Miller, Philip, Robinson, Ruby, Sherman, Springdale and Wilson.

6—Isabel.

6 to 7—Beverly, Boynton, Dayton, Irene and Warfield.

7—Allen.

7 to 8—Fairmount, Little 26, Lovett, Muskingum, Richmond and Rio.

8—Bisel.

9—Woolverton.

9 to 10—Williams.

10—Saunders and Van Deman.

Of the varieties with a favorable record for the past trying season, and which bring a promising record from previous trials, we may name Warfield, as still maintaining its previous standing, together with the comparatively recent varieties—Isabel (No name), sent out by Thompson's Sons, Rio Vista, Va., and Saunders and Woolverton, two recent seedlings, originated by Mr. John Little of Ontario. The last three seem worthy of trial, as market varieties.

RASPBERRIES.—*Rubus.*

As a means of avoiding the intermixing of the suckering varieties, these are planted in plats alternating with blackberries and blackcaps.

The raspberries, in common with the entire plantation, received a spray of strong copper sulphate dissolved in water, while yet dormant, as a preventive of fungus, which has been notably absent, with the exception of a slight attack of anthracnose, which was promptly treated with a spray of Bordeaux.

Insects also have been notably absent, so far as this fruit is concerned.

The early promise of fruit was very good; but the occurrence of hot, dry weather during the ripening season, dried and nearly or quite ruined a large share of the crop, though a copious rain came in time to save a portion of such varieties as were not already past recovery.

The weight of an average berry is given in fractions of an ounce.

Productiveness and quality are expressed upon the scale, 1 to 10; the latter being the maximum.

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Tabulation of Raspberries, 1897.

Abbreviations: c, conical; o, oblate; ob, oblong; r, roundish; b, blackish; p, pubescent; pu, purplish; r, red; y, yellow.

No.	Names.	Plant.					Fruit.				Remarks.
		Species.	Bloom.	First picking.	Last picking.	Product	Form.	Color.	Av. berry in fractions of an inch. Weight.	Quality. (Scale 1-10)	
1	Ada	Occidentalis	June 17								Worthless.
2	Brandywine	Strigosus	" 15	July 13	Aug. 21	8	r c	c	1/8	7	Formerly popular for market.
3	Cardinal	Neglectus	" 12	" 12	" 13	10	r c	c	1-20	6-7	Both suckering and tiprooting.
4	Carman	Occidentalis	" 2	" 12	" 29	10	r	b	1-20	5	Not relatively valuable.
5	Caroline	Neglectus	" 9	" 12	" 7	10	r	y	1-30	2-3	Low quality: productive.
6	Centennial	Occidentalis	" 8	" 12	" 31	9 10	r	b	1-20	6 7	Not comparatively valuable.
7	Champlain	Strigosus									Not yet in fruit.
8	Church	Strigosus	June 9	July 13	Aug 23	7	r	pu	1 15	7-8	A slender grower.
9	Clark	Occidentalis									Not yet fruiting.
10	Columbian	Neglectus	June 14	July 16	Aug. 13	7-8	r o	pu	1 16	3 4	For canning.
11	Conrath	Occidentalis	" 10	" 12	" 31	10	r	b	1 20	5	One of the earliest.
12	Cromwell	Occidentalis	" 7	" 10	" 27	10	r	b	1-20	5	Similar to the foregoing.
13	Cuthbert	Strigosus	" 9	" 12	" 13	6	c	c	1 14	5-6	Most popular of the reds.
14	Diamond	Occidentalis	" 10	" 16	" 6	7 8	r o	b	1-18	7 8	Promising.
15	Doolittle	Occidentalis	" 8	" 12	" 12	10	r	b	1-22	5 6	The pioneer blackcap.
16	Earhart	Occidentalis	" 8	" 12	" 27	9	r	r	1 25	5 6	Autumn fruiting.
17	Early King	Strigosus	" 7	" 12	" 13	7	r	r	1 15	7 8	New and very promising.
18	Emmett	Neglectus	" 15	" 13	" 2	8	r	pu	1-23	3 4	New.
19	Eureka	Occidentalis	" 10	" 12	" 31	10	r o	b	1 18	5-6	Very valuable.
20	Farnsworth	Occidentalis	" 8	" 12	" 6	10	r o	b	1 30	4-5	Promising.
21	Gault	Occidentalis									Not yet fruited.
22	Gladstone	Neglectus	June 9	July 12	Aug. 29	7	r c	pu	1-32	4-5	Double cropper, but worthless.
23	Golden Queen	Strigosus	" 11	" 13	July 29	7	r c	y	1-16	7-8	Excellent for home use.
24	Green	Occidentalis	" 4	" 12	Aug. 6	10	r	b	1-27	5 7	Of doubtful value.
25	Gregg	Occidentalis	" 11	" 14	" 6	9	r o	p b	1-20	5 6	Productive. Plant tender.
26	Hansell	Strigosus	" 3	" 7	" 5	5	r	c	1-17	5 6	Earliest red variety.
27	Herstine	Idæus hyb.?	" 7	" 10	Sept 6	9-10	r o	r	1 13	9-10	Best red. Plant tender.
28	Hilborn	Occidentalis	" 10	" 12	Aug. 3	10	r o	b	1 29	5 6	Of superior quality.
29	Idaho	Occidentalis	" 12	" 17	" 2	10	r o	b	1 14	5 6	Of doubtful value.
30	Indiana	Occidentalis	" 7	" 15	" 2	10	r o	b	1/8	5 6	Has not become popular.
31	Mayberry	Microphyllus									Not yet fruited.
32	Japanese Wineberry	Phœnicolasius	June 23	Aug. 2	Sept.		r o	r	1-40	1 2	Very vigorous, but worthless.
33	Johnston	Occidentalis	" 10	July 13	Aug. 31	10	r o	b	1-23	4-5	Fruit too seedy.
34	Kansas	Occidentalis	" 10	" 12	" 31	10	r o	b	1-23	4-5	Increasingly popular
35	Kenyon	Strigosus	" 10	" 12	" 27	6-7	r	r	1-13	5 6	New, promising.

36	**Logan**	Hyb. Idæus Ursinus	June 9								Not yet fruiting.
37	Loudon	Strigosus	" 10	July 13	Aug. 21	5-6	r	r	1-15	4 5	Very promising.
38	Lovett	Occidentalis	" 9	" 13	" 31	10	r	b	1-30	10	Needs farther trial.
39	Marlboro	Strigosus Idæus	" 9	" 10	" 9	8	r	r	1 16	5 6	Low quality. Market.
40	Miller	Strigosus	" 9	" 10	" 21	5 6	r c	r	1 15	7 8	New, very promising.
41	Mills *15*	Occidentalis	" 10	" 17	" 5	10	r	b	1-18	6 7	New, needs farther trial.
42	Muskingum	Neglectus	" 15	" 19	" 13	9-10	r o	pu	1 12	5 6	Much like Shaffer.
43	Nemaha	Occidentalis						b			Not yet in fruit.
44	Ohio	Occidentalis	June 7	July 12	Aug. 31	10	r	b	1-28	6 7	Very seedy.
45	Older	Occidentalis	" 7	" 14	" 7	9-10	r	b	1 19	4 5	Good market blackcap.
46	Onondaga	Occidentalis									Not yet well tested.
47	Otis	Neglectus	June 15	July 19	Aug. 29	10	r	pu	1 13	4-5	Vigorous.
48	Palmer	Occidentalis	" 8	" 10	" 29	10	r	b	1 28	7 8	Superior, early.
49	Phœnix	Occidentalis	" 10	" 12	" 9	5	r	b	1-15	5 6	Needs farther trial.
50	Progress	Occidentalis	" 8	" 10	July 31	9 10	r	b	1 20	5 6	Nearly superseded.
51	Redfield	Neglectus	" 6	" 15	Aug. 2	9	r	pu	1 20	3 4	New, western.
52	Reeder	Strigosus	" 9	" 12	" 6	5 6	r c	r	1-17	8 9	Superior for desert.
53	Reliance	Strigosus	" 9	" 12	" 14	6 7	r	pu r	1-17	4 5	Acid. Very hardy.
54	Sarah	Strigosus									Not yet in fruit.
55	Shaffer	Neglectus	June 15	July 19	Aug. 13	10	r	pu	1 16	5 6	One of the best for canning.
56	Smith *Giant*	Occidentalis									Not fruiting.
57	Smith *Prolific*	Occidentalis	June 10	July 15	July 31	7 8	r	b	1 22	7 8	An Ontario seedling.
58	Souhegan	Occidentalis	" 8	" 10	" 27	10	r	b	1 24	5 6	Old Very early.
59	Strawberry—Raspb'y	Rosæfolius	" 23	" 29	Oct. 4	1	r ob	r	1 6	2 3	A curiosity only.
60	Superlative	Idæus	" 9	" 10	Aug. 2	6	c	r	1-10	4 5	Origin foreign.
61	Thompson	Strigosus	" 9	" 7	" 6	6 7	r	r	1 22	4 5	Of doubtful value.
62	Thwack	Strigosus	" 10	" 10	" 17	6 7	r	r	1 15	5 6	A market variety.
63	Turner	Strigosus	" 17	" 12	" 9	5	r c	r	1 22	8-9	Nearly superseded.
64	Tyler	Occidentalis	" 8	" 10	July 31	10	r	b	1 24	5 6	Like Souhegan.
65	Winona	Occidentalis	" 7	" 12	" 27	6 7	r o	b	1 24	4-5	Of uncertain value.

Notices are appended of such varieties as are, or promise to become desirable for either the home garden or for commercial planting, as well as of certain more recent ones not yet fully tested.

For convenient reference they are alphabetically arranged, as far as practicable, by their recognized common names, and also designated specifically.

AMERICAN RED RASPBERRIES—*R. strigosus.*

(*Including possible and supposed hybrids with R. Idæus.*)

Brandywine, Cuthbert, Early King, Hansell, Loudon and Miller rank as more or less desirable commercial varieties.

Church is large, and of high, sprightly flavor, but so inclined to crumble in picking, as to be quite objectionable. The plant also lacks vigor and productiveness.

Gladstone, sent forth, years since, under an honored name, produces a crop of fruit at the usual season, and a second one, in autumn, upon the current season's canes, but both are practically nearly or quite worthless, at least in our northern climate.

Golden Queen is merely a yellow Cuthbert, in plant as well as in fruit. It is the best of the yellow, suckering varieties; though, unfortunately, somewhat lacking in productiveness. It is well worth a place in the home plantation.

Marlboro and Thwack are regarded as hybrids. Both are of rather low quality. They are popular on account of size, and perhaps productiveness and good handling qualities.

Reeder, next to Herstine, is large, excellent, and fairly productive. The best of the red varieties for the home plantation.

Turner, though very hardy, and of excellent quality, is too small and unattractive in appearance. It is nearly or quite superseded.

BLACKCAPS.—*R. occidentalis.*

Conrath, Cromwell, Souhegan, Tyler, Doolittle and Palmer are among the earliest of the species. Of these, Palmer has, so far, proved superior in size and productiveness, though others approach it very nearly in these respects.

Earhart is desirable, if at all, for its habit of producing a second crop of fruit, in autumn, upon the current season's canes, which, however, in this climate, is quite liable to be ruined by frost while yet immature.

Eureka, Gregg, Kansas, Nemaha, and several others are valuable as medium to late commercial varieties.

Hilborn is of superior quality; and for this reason, desirable for the home plantation, for those who prefer blackcaps.

Johnston and Ohio are productive and popular for evaporating, yielding, as they do, an unusually large percentage of the dried product, which, however, is mainly due to their excessive seediness.

A very considerable number of the tabulated varieties of this species, though for several years before the public, and of nearly or quite average quality and actual value, seem likely never to win popularity, and may, perhaps, be dropped from our lists, while others, yet more recent, require a longer trial to determine their true status.

EUROPEAN RASPBERRIES—*R. Idæus.*

Also including possible hybrids.

Herstine (a possible hybrid between *Idæus* and *strigosus*), although rarely injured by the cold of our lake shore winters, is generally safer with slight protection. The fruit is large, bright red, and of excellent quality—a fruit for the home garden.

Superlative is scarcely yet properly tested here. The fruit is unusually elongate-conical; and of mild favor.

INTERMEDIATE AMERICAN RASPBERRIES—*R. Neglectus.*

Muskingum and Shaffer are chiefly valued as superior canning varieties, and several others of this species are similarly useful; while others, yet but partially tested, may be regarded as promising for similar purposes. As a species, their dull color and "smoky" appearance are objectionable.

By many persons it is assumed that this species is the result of accidental hybridization, probably between *R. occidentalis* and *R. strigosus.*

JAPANESE MAYBERRY—*R. microphyllus*; Syn., *R. palmatus.*

This was originated by Luthur Burbank, of Santa Rosa, California, as an improved *R. palmatus*, its parentage being *R. palmatus*. pollinated with Cuthbert pollen. *R. palmatus* being a synonym of *R. microphyllus*, that is retained as the leading specific name.

The plant has not yet fruited here; and its hardiness here is doubtful. It will receive protection during the coming winter.

JAPANESE WINEBERRY—*R. phœnicolasius.*

This has now been on trial here for several years, and the plants prove entirely hardy in this lake shore climate. The foliage is healthy and the plant vigorous. The bloom also is large, showy and abundant, but the fruit, though bright colored, is practically worthless.

Reports, from diverse sources, indicate that other varieties, of much higher quality, are in cultivation; and it seems probable that a batch of seedlings, of varying quality, have been distributed.

LOGAN—*R. ursinus. X R. Idæus.*

This is supposed by the originator to be the result of hybridization as above, although, till quite recently, hybridization between species has been very rare.

It has not yet fruited here, and its hardiness is yet somewhat in doubt.

STRAWBERRY-RASPBERRY—*R. rosæfolius*; Syn., *R. sorbifolius.*

This is herbaceous in habit, increasing, as does quack grass and Canada thistle by underground stolons, for which reason it may, perchance, even become a troublesome weed.

Here it grows to the height of two feet or more, and blooms and fruits sparsely till frost. The blossoms are single, but large and showy, and the fruit beautiful, but worthless. It matured specimens here, this season, as late as the middle of October.

For the specific names of the foregoing recent novelties, the writer is indebted to Assistant Pomologist Wm. A. Taylor, of the National Department of Agriculture, and to Professor L. R. Taft, of the Michigan Agricultural College.

BLACKBERRIES—*Rubus villosus.*

The plantation was treated in early spring, while growth was yet dormant, with a strong solution of copper sulphate as a preventive of fungus.

The only insect which has proved troublesome during the past season is the leaf miner, which has been increasingly abundant for several years past. Specimens of this insect and its work, were sent to the Entomological Division of the National Department of Agriculture, and there reported to be, probably, *Lithocolletis ænea*: but with the statement that little is known of its habits, and that no better method of attacking it can be advised, than that we have already pursued—the prompt gathering and burning of the affected foliage, which is unavoidably a slow and expensive process; especially since there is, apparently, a second brood, necessitating a repetition of the process.

The stand of plants is now in its third year since replanting, but owing, at least in part, to repeated and severe drouths, and also to the custom of originators and introducers, of sending an insufficient number of plants for a trial stand, a comparison of varieties, based upon total products is, in many cases, impracticable, for which reason resort is had to comparative estimates.

Severe drouth, during the growing and ripening season, nearly or quite ruined the fruit of many varieties, though a timely rain served to revive such as were not already past help.

In the following table, as well as throughout this report, specific names, as well as objectionable words employed in naming fruits, are italicised; and the latter are dropped in all cases when not necessary to insure identity:

Tabulation of Blackberries, 1897.

No	Names.	Plant.					Fruit.				Remarks.
		Planted.	Bloomed.	First picking.	Last picking.	Product	Form.	Color.	Weight. Ounces.	Quality. Scale (1-10)	
1	Agawam	1888	June 11	July 31	Aug. 28	5	r o i	b	1-5	7-8	Not sufficiently productive.
2	Ancient Briton	1888	" 7	" 31	Sept. 10	10	o	b	1-6	8-9	Productive, but lacks size.
3	Childs *Tree*	1888	" 17	" 29	Aug. 27	7	r ov	b	1-8	4-5	Its value not yet determined.
4	Early Harvest	1888	" 14	" 22	" 27	10	o	b	1-15	5-6	Lacks hardiness.
5	Early King	1890	" 9	" 22	" 10	7	o i	b	1-14	7-8	A berry for the home garden.
6	Early Mammoth	1888	" 7	" 30	" 27	10	o i	b	1-9	6-7	An early market berry.
7	El Dorado	1894	" 9	" 29	" 25	8	o ov	b	1-13	6-7	Variably productive.
8	Erie	1888	" 12	Aug. 2	Sept. 8	10	o	b	1-7	4-5	Large, showy, plant very thorny.
9	Fruitland	1893	" 15	" 12	" 8	9	r o	b	1-8	4-5	Only partially tested.
10	Kittatinny	1888	" 14	July 31	" 8	10	o i	b	1-9	7-8	Old, flavor superior.
11	Knox	1888	" 12	" 27	" 8	10	o	b	1-6	6-7	Large, hardy; lacks productiveness.
12	Lawton	1888	" 14	" 31	" 8	10	o	b	1-6	6-7	Still valued for market.
13	Lincoln	1893	" 9	Aug. 4	" 13	10	r ov	b	1-10	8-9	Requires further trial.
14	Lovett *Best*	1896	" 15	" 2	" 12	4	r	b	1-13	5-6	But partially tested.
15	Maxwell	1894	" 11	July 29	" 16	8	r o	b	1-9	5-6	Promising.
16	Minnewaska	1888	" 12	Aug. 2	" 13	10	r o	b	1-7	5-6	A market variety.
17	Nevada	1888	" 11	July 31	" 16	10	o	b	1-6	5-6	Rather variable.
18	Ohmer	1893	" 9	" 30	" 10	10	r ov	b	1-6	6-7	From Ohio; try further.
19	Otis	1897						b			Not yet in fruit.
20	Oregon *Everbearing*	1893	" 23	Aug. 16	" 10	7	o	b	1-12	5-6	A curiosity; cut leaved.
21	Piasa	1895	" 12	July 31	Aug. 17	6	o i	b	1-16	5-6	Its first fruiting.
22	Reyner	1896	" 8	Aug. 2	" 31	5	o ov	b	1-9	5-6	New, promising.
23	Sanford	1894	" 8	" 4	" 23	7	o i ov	b	1-13	4-5	Not fully tested.
24	Snyder	1888	" 9	July 31	" 25	10	o i	b	1-9	9-10	Rather small, very hardy.
25	Taylor	1888	" 9	" 31	Sept 10	10	r o	b	1-8	9-10	Good, hardy; valuable.
26	Thompson	1888	" 11	" 29	Aug. 23	7	o i	b	1-7	3-4	Value doubtful.
27	Triumph *Western*	1888	" 10	Aug. 2	" 25	10	r o	b	1-12	4-5	Hardy, productive; too small.
28	Wallace	1888	" 12	July 30	" 27	10	o	b	1-8	6-7	Large, good, hardy.
29	Wilson	1888	" 10	" 30	" 23	10	o i	b	1-8	3-4	Large, low quality; tender.
30	Wilson, Jr.	1888	" 10	" 30	" 27	10	o i	b	1-10	3-4	Large, low quality; tender.

DEWBERRIES—*R. Canadensis.*

1	Austin	1896									From Texas; not yet fruited.

Abbreviations: i, irregular; o, oblong; ov, ovate; r, roundish; b, black

Agawam, Knox and Wallace are fairly hardy, large, and of good quality; but scarcely productive enough to be popular for market planting.

Ancient Briton and Triumph *Western*, are vigorous, very hardy and productive, but quite too small for market unless under high culture, severe pruning and liberal fertilizing.

Childs *Tree* has done unusually well the past season, but so far does not seem entitled to the name "*tree*," and must continue to improve to win popularity.

Early Harvest is tender, and needs winter protection, even at the lake shore.

Early Mammoth, though possessing good qualities for the market, has so far, failed to win popularity.

Early King, El Dorado, Erie, Lincoln, Minnewaska, Nevada and Thompson, occupy a sort of middle ground between success and failure.

Fruitland, Lovett, Maxwell and Ohmer are not yet fairly past the probationary stage.

Kittatinny, Lawton, Snyder, Taylor, Wilson and Wilson Jr. have long been popular with planters, and seem likely to maintain such position for an indefinite period.

Otis, Piasa, Reyner and Sanford are yet too recent to have given reliable indications of their true character.

Oregon *Everbearing* is a cut leaved variety from the Pacific coast. It has no value here, save perhaps as a curiosity.

Of those mentioned, Kittatinny, Snyder and Taylor rank highest in quality, and are specially desirable for the home plantation, while they are also among the more profitable market varieties.

Of Dewberries, the Austin is highly praised in the place of its origin, at the south, but it can scarcely be expected to excel or even equal the Lucretia, which was introduced and found successful many years since. Indeed it can scarcely be expected that this fruit can ever become popular, save perhaps as a means of opening the blackberry season a few days earlier.

SERVICE BERRY—*Amelanchier.*

SYNONYMS—JUNE BERRY, SHAD BUSH.

The varieties so far tested here are dwarfs, making growths not more than four or five feet in height.

Common is so designated since it was originally received without name.

Success is the variety introduced, several years since, under this name. It differs very slightly, if at all, from the foregoing.

Mammoth, received more recently, from Indiana, was, at the first, apparently, somewhat more vigorous than the others; but, more recently, these varieties differ very little, if at all, in this or any other respect.

A plant, received this season, from the Department of Agriculture, at Washington, as a supposed distinct variety, has not yet grown sufficiently to develop any distinguishing peculiarities.

Birds are especially fond of this fruit, which, in appearance, is very similar to that of the native huckleberry, although by no means equaling it in quality. If planted in sufficient quantity, it might become the means of diverting the attacks of birds from other and more important fruits of the same season.

CURRANTS.—*Ribes.*

The stand of currants, having been transplanted two years since, is not yet at its best, so far as the yield of fruit is concerned, while it is also true, that several of the newer varieties have not yet a full stand of plants.

On March 29th, foliage being yet dormant, the plants were sprayed with a solution of one pound of copper sulphate, in twenty-five gallons of water.

The spray of potassium sulphide, used to prevent mildew of gooseberries, proves effective also in preventing loss of the foliage of currants, for which reason a spray of this has been occasionally applied to the currants also.

On May 29th, aphides having appeared on the foliage of currants they were treated with a decoction of tobacco stems in water, the same being directed upon the under side of the leaves where only these insects occur.

The imported currant borer—*Ægeria tipuliformis*, which has, for several years, proved a very troublesome enemy of the currant throughout this region, has been persistently attacked by cutting away and burning the infested twigs. This has already so reduced their numbers that a careful examination, in early November of the present year, only detected a single larva.

The currant worm—*Nematus ventricosus*, appeared at the usual season but yielded readily to the usual treatment with a spray of buhach in water. This is considered preferable to the usual poisonous applications, since it must be applied when the fruit is near ripening.

TABULATION OF CURRANTS.—*Ribes rubrum* and *nigrum.*

Names.	Origin.	Planted.	Bloomed.	Ripe.	Productiveness.—Scale 1 to 10.	Form.—r, roundish.	Color.—b, black; r, red; w, white.	Quality.—Scale 1 to 10.	Weight of cluster in ounces.	Use d, dessert; k, kitchen; m, market.
Champion	England	1889	May 10	July 17	8	r	b	5-6	1-6	m k
Cherry	Europe	1888	" 4	" 7	10	r	r	5-6	⅓	m
English	England	1892	" 10	" 14	10	r	b	5-6	¼	m k
Fay	New York	1888	" 5	" 10	10	r	r	6-7	⅓	m k
Holland	Europe	1889	" 10	" 25	------	r	r	5	------	m k
Lakewood	Ohio	1890	" 6	" 10	10	r	r	6-7	⅓	m k
Lee	America?	1888	" 10	" 17	10	r	b	3-4	¼	m k
London	England	1890	" 4	" 10	10	r	r	4 5	⅓	m k
Naples	Europe	1888	" 4	" 10	10	r	b	5 6	⅓	m k
North Star	Minnesota ?	1890	" 4	" 19	10	r	r	6-7	⅓	m k
Red Dutch	Europe	1888	" 4	" 19	10	r	r	7-8	⅓	d k
Ruby Castle	Europe?	1892	" 4	" 15	7	r	r	6-7	1-5	d k
Ruby *Moore*	New York	1890	" 4	" 17	10	r	r	7-8	⅓	d k
Saunders	Ontario	1890	" 10	" 14	10	r	b	3-4	1-7	m k
Select *Moore*	Massachusetts?	1890	" 4	" 10	10	r	r	5-6	⅓	m k
Versaillaise	France	1888	" 5	" 10	10	r	r	6-7	¼	m k
Victoria	England	1888	" 8	" 10	10	r	r	5-6	⅓	m k
Wales *Prince*	Ontario?	1890	" 10	" 10	10	r	b	5-6	1-6	m k
White Dutch	Europe	1888	" 5	" 10	10	r	w	10	¼	d k
White Gondoin	Europe	1890	" 5	" 10	9	r	w	9	⅓	d k
White Grape	Europe	1888	" 4	" 10	10	r	w	7-8	¼	d k m
Wilder	New York	1890	" 4	" 10	10	r	r	6-7	⅓	m k

Botanically, the red and the white currants are both included in the species—*rubrum*; and the black, fetid varieties belong to the species—*nigrum*. Since, therefore, the color of the fruit unmistakably indicates the species, the botanical column is omitted from the tubulation.

The black currants, *R. nigrum*, are all very much alike in quality as well as in productiveness as grown here; but Naples stands easily at the head of the list, so far as vigor of the plant is concerned.

Crandall, *R. aureum*, has been dropped as valueless, for any practical purpose. and was not included in the recent replanting of currants.

Cherry and Fay, though by no means superior if even equal to others in quality, or even in productiveness, are large, and for this reason only are popular with commercial planters.

Holland possesses great vigor of plant, as well as persistency of foliage, while it compensates for its rather small berry in length of cluster, together with productiveness. It is a popular market variety at the west.

Lakewood and Wilder have the characteristic foliage, as well as the large fruit of Cherry and Fay, though in most seasons they have not equaled them in productiveness.

London *Red*, sometimes called *London Market*, is very vigorous and productive, and for these reasons somewhat popular as a market variety, though neither very large nor of high quality.

North Star is of recent origin and the plant very vigorous, though, so far, it has not proved superior in other respects.

Red Dutch, though among the very oldest varieties, is scarcely equaled, all things considered, by any modern ones. Under proper, liberal treatment, it very nearly equals Cherry in size, and is superior to it in flavor.

Ruby Castle and Ruby *Moore* are amateur varieties; the latter, especially, being superior in quality.

Select *Moore* is, in fruit, much like Cherry, but quite superior to that variety in quality.

Versaillaise, though somewhat distinct in habit of growth, is so much like Cherry that, formerly, many persons considered them identical.

Victoria holds its foliage later than most other varieties and the shoots are seldom attacked by the twig borer *Ægeria tipuliformis*, for which reason, mainly, it is extensively planted for the market.

White Dutch and White Gondoin are much alike, as grown here. They have yet no superior, so far as beauty and mild, rich flavor are concerned, though slightly inferior to certain others in productiveness.

White Grape has a more spreading habit of growth, with slightly larger fruit, and is somewhat more productive, though scarcely equal to the foregoing in quality. It is occasionally planted for commercial purposes.

GOOSEBERRIES—*Ribes*.

Gooseberries, while yet dormant, were sprayed on March 29th with a solution of one pound of copper sulphate in twenty-five gallons of water, as a preventive of mildew.

On May 4th the plat was treated with a spray of three ounces of potassium sulphide, (liver of sulphur) in ten gallons of water. This treatment was repeated weekly, weather permitting, until the fruit was ripe and gathered.

On June 10th owing apparently to unfavorable climatic conditions or possibly, to imperfect spraying, mildew appeared upon the fruit of some of the European varieties. The infected fruit was at once gathered and burned.

The crumpling of the foliage, due apparently to the presence of aphides, has been very rare this year. It usually appears only at the tips of the young twigs, which are cut away and burned, when discovered.

The currant worm, *Nematus ventricosus*, which attacks the foliage of the gooseberry, in common with that of the currant, was also sprayed with a decoction of buhach in water with similarly satisfactory result.

Several varieties, although tabulated, have, for one cause or another, failed to fruit satisfactorily, for which reason, unavoidably, several particulars are not given in the table.

TABULATION OF GOOSEBERRIES, 1897.

Names.	Species.	Planted.	Bloomed.	Ripe.	Weight of berry in ounces.	Productiveness. Scale 1 to 10.	Quality.—Scale 1 to 10.
Apex	Grossularia ?	1893	May 5	July 25	¼	10	7-8
Auburn	"	1890	" 10	" 21	⅓	10	8-9
Bendelon	"	1894	" 10	" 19	1-5	10	5-7
Champion	"	1891	" 10	" 19	1-17	10	5-6
Chautauqua	"	1892	" 6	" 19	¼	10	7-8
Columbus	"	1895	" 5	" 24	------	------	6-7
Downing	Oxyacanthoides	1888	" 6	" 21	1-7	10	6-7
Golden *Prolific*	Grossularia	1891	" 12	---	------	------	------
Houghton	Oxyacanthoides	1888	" 5	July 14	1-16	7	10
Industry	Grossularia	1889	" 12	----------	------	------	------
Keepsake	"	1894	" 10	July 19	⅓	7	8-9
Lancashire	"	1894	" 6	" 19	⅓	10	5-6
Orange	"	1890	" 5	" 13	1-10	9	8-9
Pale Red	Oxyacanthoides	1890	" 5	" 12	1-22	10	9-10
Pearl	"	1890	" 5	" 19	1-6	9	7-10
Red Jacket	" ?	1890	" 12	" 21	1-6	7	7-8
Smith	"	1888	" 5	" 14	⅛	7	9-10
Strubler	Cynosbati	1892	" 5	" 19	1-6	10	7-8
Tree	"	1892	" 18	" 26	1-12	3	5-6
Triumph	Grossularia	1890	" 10	" 21	⅓	4	6-7

Apex, a recent seedling from Oregon, has this season, for the first time, produced a fair crop of fruit. It has been understood to be a seedling of the indigenous variety of that region but the habit of growth, and also the size and general character of the fruit, correspond so perfectly with *R. grossularia*, as to warrant the suspicion that it may be an Oregon seedling of that species.

Auburn, Bendelon, Champion, Chautauqua, Columbus, Golden Prolific, Keepsake, Orange, Pearl, Red Jacket and Triumph are understood to be either American seedlings of the European species or possibly hybrids between native and foreign varieties.

Downing and Smith seem to have been very generally accepted as native seedlings, and yet there is more or less ground for suspicion of possible hybridization between the native and the foreign species.

Houghton and Pale Red are among the oldest of the native cultivated varieties, and, so far, are scarcely excelled in either productiveness or quality. Small size is their chief fault.

Strubler and Tree are obviously pure natives. The plants are vigorous and healthy, and the fruit, especially of the former, is of high quality. They are of rather small size, and, so far, only moderately productive.

CHERRIES—*Prunus.*

At the date of blooming there was promise of a bountiful crop of this fruit, but, subsequently, the season proved so specially unfavorable that a very large percentage of the bloom proved abortive.

Putnam scale having been discovered on a few trees, they were sprayed March 31st with kerosene emulsion, consisting of five gallons of kerosene and six pounds of whale oil soap, in forty gallons of water.

Prior to April 15th, growth remaining dormant, the remainder of the cherries were sprayed with a solution of copper sulphate, consisting of one pound of the sulphate in twenty-five gallons of water.

On July 2d and again on the 6th sprayed several cherry trees on which the slug, *Eriocampa cerasi*, had appeared, with kerosene emulsion on the former, and tobacco decoction on the latter date. Both proved effective.

Aphides have proved unusually persistent this season. They appeared on the foliage of a few cherry trees late in September, and were subdued by the use of tobacco water.

In the foregoing tabulation, as well as throughout this report, the numerical estimates upon the scale 1 to 10 are arrived at by comparing varieties of the same *species* only; as, for instance, comparing morellos with morellos, dukes with dukes, and sweet cherries with sweet cherries, ten being the maximum.

These deductions, being based upon the crop of the past unusually unfavorable season, can scarcely be accepted as a trustworthy indication of the comparative value of varieties during other seasons.

TABULATION OF CHERRIES, 1897.

Names.	Species.	Planted.	Bloomed.	Ripe.	Weight of a specimen in ounces.	Productiveness.—Scale 1 to 10.	Quality.—Scale 1 to 10.
Abbesse	Morello	1888	May 8	July 21	1-4	1	5-6
Angouleme	"	1888	" 8	" 26	1-6	2	6-7
Badacconyi	Avium	1894	" 8				
Baendor	Morello	1892	" 8				
Baltavari	Avium	1894	" 8				
Bessarabian	Morello	1888	" 8	Aug. 2			
Brusseler Braune	"	1888	" 10	" 2			
Carnation	Duke	1891	" 8	July 9	1-6	9	7-8
Centennial	Avium	1893	" 7				
Choisy	Duke	1888	" 8		1-6		9-10
Cleveland	Avium	1888	" 7	June 30	1-5	5	7-8
Coe	"	1888	" 8	" 26	1-5	4	4-5
Downer	"	1888	" 8	July 15	1-7	3	5-6
Dwarf Rocky Mountain	Besseyi	1894	" 20				
Dyehouse	Morello	1891	" 8	June 30	1-8	6	5-6
Eagle *Black*	Avium	1888	" 8	July 12	1-7	2	5-6
Early Purple	"	1892	" 6	June 25	1-6	5	4-5
Elton	"	1892	" 8	" 30	1-5	2	4-5
Esperen	Morello	1892	" 8			1	
Eugenie	Duke	1888	" 7	June 30	1-6	2	8-9
Everbearing	"	1892	" 8	" 12	1-6	7	8-9
Florence	Avium	1892	" 8				
Frauendorfer Weichsel	Morello	1888	" 8	June 21	¼	1	6-7
Galopin	"	1891	" 8				
George Glass	"	1888	" 10			1	
German *Kraus*	Avium	1894	" 13				
Griotte du Nord	Morello	1888	" 8	Aug. 2		1	
Hortense	Duke	1888	" 8	July 8	1-5	5	7-8
Ida	Avium	1893	" 8				
King Amarelle	Morello	1891	" 8	July 19	1-8	1	4-5
Knight Early	Avium	1891	" 7			1	
La Maurie	Avium	1893	" 8				
Lancaster	Duke	1894	" 13				
Late Duke	Duke	1890	" 8	July 15	¼	1	7-8
Lithauer Weichsel	Morello	1892	" 8	" 22	1-9	6	4-5
Lutovka	"	1888	" 8			1	
Magnifique	Duke	1888	" 13	July 28	1-6	5	8-9
Mahaleb	Mahaleb	1893	" 8				
Mary *Kirtland*	Avium	1891	" 8	June 30	1-6	7	6-7
Mastodon *Black*	"	1893	" 8				
May Duke	Duke	1888	" 8	June 30	1-7	6	8-9
Mezel	Avium	1891	" 7	" 30	1-7	2	4-5
Minnesota Ostheim	Morello	1892	" 8	July 9	1-8	1	6-7
Modnyansky	Avium	1894	" 8				
Montmorency	Morello	1888	" 10	June 30	1-7	5	4-5
Montmorency Ordinaire	"	1891	" 8	July 22	1-5	9	5-6
Montrueil	Duke	1890	" 8	" 12	1-5	3	8-9
Napoleon	Avium	1892	" 7	" 17	1-7	8	3-4
Northwest	Morello	1893	" 12	" 19	1-7	10	5-6
Ohio *Beauty*	Avium	1891	" 8	June 30	1-6	7	6-7
Olivet	Duke	1890	" 8	July 12	1-5	1	7-8
Orel 25	Morello	1893	" 10				
Orel 27	"	1893	" 10				
Ostheim	"	1891	" 8	July 21		1	3-4
Ostheimer	"	1893	" 8	" 22	1-6	9	4-5
Philippe *Louis*	"	1888	" 8	" 8	1-8	1	7-8
Plymouth *Rock*	Avium	1896					
Purity	"	1893	" 10				
Richmond	Morello	1893	" 8	July 12	1-8	5	4-5
Rockport	Avium	1891	" 7	June 30	1-5	8	6-7

TABULATION OF CHERRIES, 1897.—*Concluded.*

Names.	Species.	Planted.	Bloomed.	Ripe.	Weight of a specimen in ounces.	Productiveness.—Scale 1 to 10.	Quality.—Scale 1 to 10.
Royal Duke	Duke	1891	" 8	June 30	1 8	10	5-6
Rupp	"	1894					
Schmidt	Avium	1894	" 8				
Sebril	"	1896	" 12				
Sklanka	Morello	1888	" 10	July 12	1-7	3	4-5
Spanish Yellow	Avium	1891	" 8	" 14	1-5	3	10
Spate Amarelle	Morello	1883	" 15	" 26	1 6	2	6-7
Strauss Weichsel	"	1888	" 8	" 8	1-6	1	5-6
Suda	"	1893	" 10	" 22	1-6	8	7-8
Tartarian *Black*	Avium	1888	" 8	" 8	1-5	2	6-7
Ulatis, *Cal. Advance*	"	1893	" 6				
Weir 2	Morello	1893	" 12	July 12	1-8	5	4-5
White *Bigarreau*	Avium	1896	"				
Windsor	"	1891	" 8	July 14	1-5	7	4-5
Wood *Governor*	"	1891	" 8	June 30	1-5	2	5-6
Wragg	Morello	1892	" 11	July 22	1-6	7	5-6

MORELLOS.

Abbesse, Angouleme, Bessarabian, Brusseler Braune, Frauendorfer Weichsel, George Glass, Griotte du Nord, Lithauer Weichsel, Lutovka, Orel 25, Orel 27, Ostheim, Ostheimer, Sklanka, Spate Amarelle and Strauss Weichsel are all understood to be importations from northern and eastern Europe, with the hope that more or less of them may prove adapted to the trying climate of our northwestern states. Of these several are vigorous, healthy and very late, strictly culinary fruits; but with one or two exceptions, so far, they are comparatively unproductive, and not relatively promising where the better known varieties succeed.

Baendor, Esperen, Galopin, King Amarelle, Minnesota Ostheim, Northwest, Suda, Weir 2 and Wragg came to us without a history, excepting only the last two, which are known or supposed to be of western origin. So far Weir 2, and possibly Suda, are apparently the most promising of these.

Of the Morellos, Dyehouse, though of very low, spreading habit of growth, with rather small, light-colored fruit, is among the first to ripen and is productive and profitable.

There are ostensibly three Montmorencys in cultivation, but there is so much confusion of names that identity is, so far, quite uncertain. The first of these came as simple Montmorency, and quite possibly may prove to be Large Montmorency. That received as Large Montmorency turns out to be Dyehouse. Trees received as Montmorency Ordinare have now fruited several seasons, but we have not, so far, been able to assuredly determine their correctness.

Philippe *Louis* is large and excellent for culinary purposes, and the tree healthy and vigorous, but, unfortunately, persistently unproductive.

Richmond *Early* has, so far, been the leading cherry for market planting, but recently there are indications that it may find a rival in some one of the Montmorencys.

DUKES.

Carnation, Late Duke, Magnifique, Olivet and Royal Duke, although vigorous, and of generally fair quality, must take second or third rank, so far as productiveness is concerned.

Choisy *Belle de*, is slightly lacking in productiveness, but is second to no other cherry in beautiful appearance and fine flavor.

Eugenie is promising, but requires further trial.

Everbearing, as the name indicates, ripens its fruit in succession during a somewhat lengthened season, and, for this reason, may prove desirable for home use.

Hortense, is one of the largest of the species, and, where hardy, is a desirable market variety.

May Duke is the type, as well as the leading variety of the species; and, where sufficiently hardy, is among the most valuable, as well as profitable for market.

Montrueil is a comparatively recent French variety. It is an early and profuse bearer and, in both tree and fruit, promises well as a commercial variety.

Lancaster and Rupp are perhaps of this species, though too recently planted to satisfactorily indicate their specific status.

HEARTS AND BIGARREAUS.

Badacconyi, Baltavari and Modnyansky are obviously of this species. They were recently imported, in cion, from southeastern Europe, by the national Department of Agriculture. So far, they are vigorous and healthy here, but have not yet matured fruit.

Centennial, Florence, German *Kraus*, La Maurie, Mastodon *Black*, Plymouth *Rock*, Purity, Schmidt, Ulatis (*California Advance*), and White *Bigarreau* are clearly of this species, although none of them have yet fruited sufficiently to warrant a description.

Cleveland, Mary *Kirtland*, Ohio *Beauty*, Rockport and Wood *Governor*, were sent out, years since, by the late Prof. Kirtland of Cleveland, Ohio. Under judicious treatment, in common with this species, they are hardy in southern Michigan.

Coe *Transparent*, is one of the most beautiful and excellent of the species, and worthy of a place in the home plantation.

Downer, and also Eagle *Black*, are unusually hardy, rather late, very productive, and valuable for either the home or market.

Early Purple is specially desirable as the earliest cherry, occasionally ripening with the earliest strawberries.

Elton, Knight *Early*, Mezel, Napoleon, Spanish *Yellow* and Tartarian *Black* are old and generally known varieties, and with two or three exceptions prized as commercial varieties.

Windsor is a quite recent introduction, ripening rather late, and promising well, even as a commercial variety.

Ida, although not yet in bearing, is believed to be of this species.

DWARF ROCKY MOUNTAIN OR SAND CHERRY.

Dwarf Rocky Mountain, *Prunus Besseyi*, has shown fruit here for the past two years. It has even been commended through the public press as well as in nursery catalogues, as of fine flavor. If, however, the plants tested here fairly represent the variety thus praised, the least that can be said of it is, that it is one of the most arrant swindles ever imposed upon the public. The difference betweeen *P. Besseyi* and *P. Pumila* being slight, we may have received the latter by mistake or otherwise.

PRUNUS MAHALEB.

Mahaleb, *European Bird cherry*, is used extensively as a stock on which improved varieties are worked. It has fruited here for two years past. The European name would seem to be appropriate for this country also, since, although it fruited abundantly the past season, we were not able to get even a taste of ripe fruit, but all were taken by birds while yet immature.

PEACHES—*Prunus* or *Amygdalus*.

Doubtless as a result of continuous reproduction and cultivation in different soils and climates, the peach has sported into strains or races, each more especially successful in its accustomed climate or soil.

Of these the Peen-to race is mainly confined to the extreme south, and is followed, as we pass northward, by the Honey race, the Spanish, the Persian, the Oriental Blood, and the North Chinese races.

Among these the Persian race is mainly popular from central Georgia and Texas northward, with, quite recently, an occasional North Chinese variety on trial.

While at the extreme south, these distinctions become important in a choice of varieties to be planted, these races have now become so intermixed or hybridized by cross-fertilization that many such cross-bred varieties are found successful and more or less popular even at the north.

Since, therefore, the question of *race* must depend upon a knowledge of the history of each variety, rather than upon any distinctive peculiarity of either tree or fruit, it seems better that all attempt at such classification be omitted.

The past season, throughout, has been later than usual, and, as heretofore, the pruning has been done while growth was yet dormant, the pruning of peaches having been completed on April 20th.

Completed the early spraying of peaches on April 15th, using one pound of copper sulphate in twenty-five gallons of water. Such spray has, in previous seasons, proved an effectual preventive of leaf curl, *Taphrina deformans*; but, for some unexplained reason, due probably to unusual weather conditions, it failed of the usual effect, the "curl" being very prevalent, alike upon sprayed trees and those not sprayed.

May 17th examined peach trees for *borers*, the larvæ of *Ægeria exitiosa*, finding a few only.

May 19th to 21st, applied a coating of whitewash to the trunks and large branches of peach trees, as a means of preventing a deposit of the eggs of the pin-borer which, during the last two or three years, has proved to be a serious and even fatal enemy of the peach tree in this vicinity. Such application is so far merely experimental, since there are no precedents as guides to the treatment of this insect. The mixture used was milk of lime with a little crude carbolic acid; the whole thickened with hard soap to give it body and tenacity. Experience so far indicates that the application will prove at least partially successful.

May 29th, some of the early varieties of peaches were jarred for curculio, but few were caught, and after a few trials the process was mainly confined to the plums, upon which the attacks were much more persistent.

The Rose Chafer, *Macrodactylus subspinosus*, which in past years has been abundant, has, during the past season, been represented by a very few specimens only, which have been caught in jarring for curculios.

We repeat the suggestion of last year that, as a safeguard against error, a new or unknown variety when sent for trial or identification, should invariably be accompanied by a careful description of both tree (or plant), and fruit, and that the intended name should accompany it, to the exclusion of numbers or of names with numbers attached, the subsequent changing of which is found to be a fruitful source of error, and of the multiplication of vexatious synonyms. Such names, moreover, should be in accordance with the Rules of American Pomology, and with the practice of the National Division of Pomology.

TABULATION OF PEACHES, 1897.

Names.	Planted.	Bloomed.	Flowers—l, large; s, small.	Glands—g, globose; r, reniform; s, serrate.	Ripe.	Adhesion—c, cling; f, free; s, semi-cling.	Weight of specimen in ounces.	Productiveness—Scale 1 to 10.	Quality—Scale 1 to 10.
Adrian	1892	May 6	s	g	Oct. 1	f	5	1	6-7
Advance	1897	------	------	------	------	------	------	------	------
Alberge	1893	May 6	s	r	------	f	------	------	------
Albright	1890	" 6	s	g	Oct. 4	f	5	1	5-6
Alexander	1892	" 6	l	g	Aug. 19	s	6	1	5-6
Allen	1890	" 6	s	r	Oct. 7	f	5	5-6	5
Alpha	1890	" 7	s	r	Sept. 27	f	------	------	------
Amelia	1890	" 7	s	r	" 9	f	4	1	6-7
Amsden	1890	" 7	l	g	July 31	s	5	2	5-6
Andrews	1890	" 7	s	r	------	f	------	------	---
Arctic	1894	" 5	l	r	Oct. 4	f	4	1	3-4
Barber	1893	" 6	s	r	Sept. 23	f	6	8	6-7
Beers *Smock*	1890	" 7	s	r	Oct. 8	f	4	1	5
Bell *Favorite*	1890	" 6	s	g	Sept. 29	f	4	1	4-5
Bequett *Free*	1890	" 6	s	r	" 23	f	7	1	5
Berenice	1894	" 6	l	r	Sept. 24	f	4	1	4
Bickell	1890	" 6	s	r	Oct. 15	f	4	5	4
Bishop	1890	" 6	l	g	Aug. 26	f	4	2	8
Blood Leaf	1892	Apr. 30	l	r	Oct. 20	c	3	5	2-3
Bokara	1896	------	------	------	------	------	------	------	------
Bonanza	1890	May 6	s	r	Oct. 15	f	4	1	1-3
Boyle	1890	" 6	s	g	Sept 17	f	5	2	7
Brandywine	1890	" 7	s	g	Oct. 8	f	6	1	5
Brett	1890	" 7	s	r	" 31	c	4	1	2-3
Brigdon, *Garfield*	1890	" 6	s	g	Sept. 13	f	5	1	7-8
Briggs	1890	" 6	s	g	" 13	f	5	1	8
Bronson	1894	" 6	s	r	" 24	f	4	2	6-7
Brown	1894	" 5	l	r	Aug. 27	f	3	5	5-6
Burke	1892	" 6	l	r	Sept. 4	s	6	1	5
California	1895	" 7	s	r	------	------	------	------	------
Canada	1892	" 6	l	g	July 31	s	5	1	4-5
Capital	1896	------	------	r	------	f	------	------	------
Chairs	1890	May 6	s	r	Oct. 13	f	5	1	3-4
Champion	1894	" 6	s	g	Sept. 8	f	6	2	10
Champion (*serrate*)	1890	" 6	l	s	Aug. 7	s	5	1	5-6
Chili 2	1888	" 7	s	r	Sept. 23	f	6	1	6-7
Chili 3	1888	" 6	s	r	" 24	f	5	1	8
Chinese *Cling*	1890	" 7	l	r	------	c	------	------	------
Chinese 11741	1896	------	------	------		------	------	------	------
Cleffey *Allen*	1892	May 6	s	r	Sept. 24	f	5	4-5	5
Clifton *Cling*	1894	" 6	s	r	------	c	------	------	------
Columbia	1890	" 7	l	r	Oct. 8	f	4	1	2-3
Conkling	1890	" 6	------	------	------	f	------	1	------
Connecticut	1896	" 7	s	g	Aug. 20	f	------	1	------
Connett	1894	" 5	l	r	" 28	f	5	1	7-8
Coolidge *Mammoth*	1892	" 6	s	g	Sept. 20	f	6	3	7
Corner	1890	" 7	s	r	" 23	f	5	3	6
Crane	1890	" 7	s	r	------	f	------	------	------
Crosby	1892	" 6	s	r	Sept. 25	f	4	5	7
Crothers	1890	" 6	s	g	Oct. 4	f	5	1	6-7
Dennis	1890	" 4	l	g	Sept. 17	f	4	1	5-6
Diamond	1892	" 6	s	g	Oct. 4	f	5	1	5
Druid Hill	1890	" 7	s	g	" 8	f	4	1	8-9
Dumont	1894	" 7	s	r	Sept. 23	f	4	1	3-4
Dunlap	1892	" 7	s	g	" 9	f	5	2	7-8
Dwarf Cuba	1892	" 6	s	r	------	------	------	------	------
Early Barnard	1888	" 7	s	r	Sept. 7	f	6	1	5
Early Crawford	1888	" 7	s	g	" 8	f	6	1	9-10
Early Crawford 1	1888	" 7	s	g	" 6	f	5	1	7-8
Early Crawford 3	1888	" 7	s	g	" 6	f	3	1	7

TABULATION OF PEACHES, 1897.—*Continued.*

Names.	Planted.	Bloomed.	Flowers—l, large; s, small.	Glands—g, globose; r, reniform; s, serrate.	Ripe.	Adhesion—c, cling; f, free; s, semi-cling.	Weight of specimen in ounces.	Productiveness—Scale 1 to 10.	Quality—Scale 1 to 10.
Early Michigan 15	1894	May 6	l	g	Sept. 2	f	4	1	9-10
Early Michigan 16	1894	" 4	l	r	Aug. 20	f	5	1	9 10
Early Red	1897	-----					-----	-----	-----
Ede	1890	May 6	s	g		f	-----	-----	-----
Elberta	1890	" 6	s	r	Sept. 23	f	-----	1	-----
Eldred *Cling*	1890	" 6	s	g	Sept 20	c	5	1	4
Ellison	1889	" 7	s	r	Oct. 7	f	4	3	5-6
Engle *Mammoth*	1892	" 6	s	g	Sept 13	f	5	2	9-10
Ford *New*	1894	" 6	s	g	" 11	f	4	1	6
Ford *Red*	1894	" 3	s	g	" 13	f	4	1	5-6
Ford 1	1894	" 3	l	r	" 27	f	4	1	6-7
Ford 2	1894	" 6	s	g	Oct 4	f	4	1	6-7
Ford 3	1894	" 8	s	r	" 30	f	4	1	4
Foster	1891	" 7	s	g	Sept. 2	f	6	1	7-8
Fox	1890	" 7	s	g	Oct. 13	f	3	1	4-5
Geary *Hold On*	1890	" 6	s	r	" 5	f	6	1	5
Gem *Cling*	1890	" 6	s	r	----	c	-----	-----	-----
Globe	1888	" 10	s	g	Sept. 24	f	6	1	6
Gold Drop	1890	Apr. 29	l	r	" 30	f	4	2	7-8
Grant *General*	1890	May 6	s	r	" 7	c	5	1	6-7
Great Western	1892	" 6	s	r	Oct 15	c	4	1	4
Greensboro	1895	" 6	l	g	-----	-----	-----	-----	-----
Gudgeon	1890	" 6	s	r	Oct 15	f	5	1	5-6
Haas	1890	" 6	l	r	Aug. 18	f	5	1	5-6
Hale	1888	" 8	l	g	" 25	s	6	1	5
Hale Oblong	1888	" 7	l	g	" 9	s	5	4	6-7
Hance Golden	1890	" 7	s	g	Sept 13	f	5	1	8-9
Hance Smock	1890	" 6	s	r	Oct. 8	f	5	1	5
Heath *Cling*	1890	" 7	s	r	----------	c	-----	-----	-----
H. No. 34	1890	----	-----	-----	----------	f	-----	-----	-----
Hinman?	1892	" 6	l	r	Sept. 27	f	6	3	7
Hughes IXL	1892	" 6	l	r	Nov.	c	2	1	1-2
Husted 101	1895	" 6	s	r	Sept. 20	f	3	1	3-4
Husted 130	1895	" 6	s	r	" 18	f	3	1	6-7
Husted 700	1895	" 6	l	g	Aug. 18	f	4	1	7-8
Hyatt	1888	" 7	l	g	" 16	s	5	1	5-6
Hynes	1890	" 7	l	g	" 18	s	5	1	5
Hyslop	1892	" 6	s	r	Oct 7	c	4	1	4
Ice Mountain	1894	" 6	l	r	Nov.	f	1	4	1
Infant Wonder	1892	" 3	s	g	Sept. 6	f	5	8	8-9
Iron Mountain	1895	" 7	s	r	Oct. 13	f	7	1	7
Jacques Late	1890	" 3	s	g	Sept. 25	f	5	2	5-6
Japan Dwarf	1894	Apr. 29	l	r	Aug 10	f	3	-----	5-6
Jersey Yellow	1895	May 6	s	r	Oct. 15	f	3	1	4 5?
Jones	1892	" 6	s	g	Sept. 24	s	7	1	4-5
June Rose	1894	" 6	l	g	" 6	f	5	1	6-7
Juno	1894	" 6	l	r	-----	f	-----	-----	-----
Kalamazoo	1890	" 6	s	r	Sept. 20	f	4	3	7-8
Kallola	1892	" 4	l	r	" 17	f	5	8	3-4
Kraus 4	1895	----------	-----	-----	----------	-----	-----	-----	-----
Kraus 16	1895	----------	-----	-----	----------	-----	-----	-----	-----
La Fayette	1897	----------	-----	-----	----------	-----	-----	-----	-----
La Fleur	1895	May 4	l	r	Oct. 5	f	3	1	2-3
Lancaster	1894	----------	-----	g	----------	-----	-----	-----	-----
Late Barnard	1894	May 7	s	r	Sept. 27	f	5	5	6-7
Late White	1889	" 7	s	r	Oct 4	f	6	1	5
Lemon *Free*	1894	" 6	l	r	" 8	f	5	5	4
Lewis	1890	" 6	l	r	Aug 26	f	4	5	6-7
Lock *Cling*	1892	" 7	s	r	Oct.	c	-----	1	-----
Longhurst	1894	" 6	l	g	Sept. 27	f	6	1	5-6

TABULATION OF PEACHES, 1897.—*Continued.*

Names.	Planted.	Bloomed.	Flowers—l, large; s, small.	Glands—g, globose; r, reniform; s, serrate.	Ripe.	Adhesion—c, cling; f, free; s, semi-cling.	Weight of specimen in ounces.	Productiveness—Scale 1 to 10.	Quality—Scale 1 to 10.
Lorentz	1895	May 6	s	r	Oct. 15	f	3	1	5-6
Lovell	1892	April 29	s	g	Sept 30	f	4	1	7-8
Lovett White	1890	May 7	s	r	" 30	f	5	2	6-7
Magdala	1890	" 7	s	r	" 8	f	5	1	8-9
Marshall	1890	" 7	s	r	Oct. 5	f	4	1	5-6
McCollister	1890	" 6	s	r	" 2	f	6	4	6
McKevitt *Cling*	1892	" 7	s	g	" 4	c	6	1	3-4
Milhizer	1892	" 7	s	g	" 15	f	4	1	5
Minnie	1890	" 7	s	r	Sept. 9	f	5	1	5-6
Moore	1890	" 7	s	g	------	f	------	------	------
Morris County	1888	" 7	s	r	Sept. 2	f	3	1	3-4
Morris White	1888	" 10	s	r	" 22	f	5	1	9
Mountain Rose	1888	" 7	s	g	" 1	f	4	1	8
Muir	1890	" 7	s	r	" 25	f	6	1	6-7
Murat	1889	" 7	s	r	Oct. 8	f	8	1	4-5
Mystery	1888	" 7	s	r	Sept. 2	f	5	1	8
North American Apricot	1892	" 6	l	r	------	f	------	2	5-6
Nectarine	1888	" 6	l	r	------	f	------	------	------
Need	1890	" 7	s	r	Sept. 7	f	4	1	5
Neil *Marshall*	1892	April 29	l	r	Oct. 15	f	3	2	4-5
Newington *Free*	1893	May 7	s	r	" 6	f	4	1	6
New Prolific	1894	" 6	s	g	Sept. 6	f	5	1	7
Normand	1892	" 7	s	r	Oct. 15	f	4	1	5
Oldmixon *Cling*	1888	" 7	s	g	Sept. 26	c	6	1	5
Oldmixon *Free*	1894	" 6	s	g	" 23	f	5	1	9-10
Oriole	1894	" 4	l	r	" 27	s	4	4	4
Ostrander	1892	" 7	s	g	" 2	f	4	1	5-6
Pallas	1894	" 6	l	g	" 17	f	------	1	------
Palmerston	1890	" 8	l	g	Oct. 5	s	7	1	7
Pansy	1890	" 8	s	r	------	f	------	------	------
Pearl	1889	" 6	s	g	Sept. 20	f	5	1	7
Peninsular *Yellow*	1894	" 6	s	g	" 24	f	5	1	5
Pickett	1890	" 7	s	r	Oct. 5	c	4	4	5-6
Pratt	1890	" 7	s	r	Sept. 8	f	------	1	------
Prince R. R.	1890	" 7	s	g	" 20	f	4	1	7-8
Princess	1894	" 6	l	g	Oct. 6	f	4	1	8-9
Princess *Wales*	1889	" 7	l	g	Sept. 28	f	------	1	------
Prize	1892	" 6	s	g	" 28	f	6	3-4	5-6
Prize 1	1890	" 7	s	r	Oct. 2	f	4	1	6
Red Cheek *Melocoton*	1893	" 6	s	g	" 4	f	5	1	5
Red Seedling	1893	" 6	l	g	Aug. 31	s	4	2	6
Reeves *Favorite*	1890	" 7	s	g	Sept. 20	f	4	1	6 7
Reid	1890	" 6	s	g	" 6	f	5	1	7-8
Ringgold	1890	" 7	s	r	Oct. 15	c	4	1	6-7
River Bank	1892	" 7	l	r	Aug. 2	s	5	2	5
Rivers	1888	" 6	l	r	" 10	f	5	5	6-8
Robena	1894	------	------	r	------	------	------	------	------
Roser	1892	May 3	l	r	Oct. 13	f	4	2	2-3
Roseville	1892	" 7	l	g	" 4	c	6	1	6
R. S. Stevens	1891	" 3	s	r	Sept. 9	f	4	4-5	6
Salway	1890	" 6	s	r	Oct. 20	f	5	9	6
Scott	1890	" 6	s	r	" 4	f	5	2	7
Sener	1888	" 10	s	r	------	f	------	------	------
Shipley	1890	" 7	s	g	Sept. 24	f	5	1	4-5
Smock *Free*	1888	" 7	s	r	Oct. 15	f	5	1	5-6
Smock	1892	" 6	s	r	" 8	f	6	2	5 6
Sneed	1896	" 4	l	r?	------	------	------	------	------
Snow *Late*	1890	" 7	s	r	Sept. 7	f	5	2	5-6
Southern Early	1890	" 6	s	r	" 7	f	------	1	------
Spottswood	1894	" 7	l	r	" 18	f	4	1	6-7

TABULATION OF PEACHES, 1897.—*Concluded.*

Names.	Planted.	Bloomed.	Flowers—l, large; s, small.	Glands—g, globose; r, reniform; s, serrate.	Ripe.	Adhesion—c, cling; f, free; s, semi-cling.	Weight of specimen in ounces.	Productiveness—Scale 1 to 10.	Quality—Scale 1 to 10.
Stark Heath	1892	May 6	s	r	Oct. 15	c	4	1	3
Steadley	1888	" 10	s	r	Sept. 2	f	4	1	7-8
Stevens Late	1890	" 7	s	r	Oct. 15	f	4	1	5-6
Stevens *Rareripe*	1892	" 7	s	r	" 2	f	5	3	7
St. John	1890	" 6	s	g	Aug. 26	f	4	1	7-8
Strong *Mammoth*	1892	April 30	s	g	Sept. 20	f	5	1	6
Stump *World*	1890	May 3	s	g	Aug. 31	f	4	4	6
Summer Snow	1894	" 6	l	g	Oct. 4	c	3	1	4-5
Surpasse *Melocoton*	1890	" 7	s	r	Sept. 6	f	4	1	8
Switzerland	1890	" 6	s	g	" 27	f	4	1	5 6
Tallman 1	1894	-----	-----	r	-----	f	-----	-----	-----
Tallman 2	1894	-----	-----	g?	-----	f	-----	-----	-----
Tallman 3	1894	May 6	s?	g	-----	f	-----	-----	-----
Toledo	1894	" 7	l	g	Aug. 26	f	4	1	6
Toquin	1892	" 7	l	r	Sept 25	f	4	5	7
Townsend	1892	" 6	s	g	" 30	f	6	1	5-6
Triumph	1896	-----	-----	g	-----	f	-----	-----	-----
Troth	1890	May 6	s	g	Sept. 4	f	5	2	5-6
Tuskena	1892	" 6	s	r	Oct. 4	c	6	1	8-9
Wager	1890	" 6	-----	r	" 2	f	4	4	4-5
Walker	1892	" 6	s	g	-----	f	-----	1	-----
Walker Var.	1893	" 6	s	g	Oct. 4	f	4	1	7-8
Washington	1890	" 6	s	g	Sept 23	f	6	1	6-7
Willett	1894	" 6	l	r	" 30	f	4	1	5-6
Williamson	1892	" 6	s	g	" 29	f	6	1	5-6
Wonderful	1890	" 6	s	r	Oct. 4	f	6	2	5
Worthen	1890	" 7	s	r	Sept. 6	f	6	1	8
Yellow Rareripe	1888	" 7	s	g	" 18	f	4	1	3-4
Yenshi *Hardy*	1896	" 7	l	r	-----	-----	-----	1	-----
York Pearl	1896	-----	s	-----	-----	-----	-----	-----	-----
Zea	1897	-----	-----	-----	-----	-----	-----	-----	-----

As the natural result of overproduction last year, the set of peaches the present year has been very light. This result has doubtless been emphasized as the consequence of unusually unfavorable weather during the season of blooming, and the prevalence of leaf curl during the setting of the fruit.

Under such conditions the result, as shown in the foregoing tabulation, should be accepted as a more or less uncertain indication of the ability of the varieties to withstand unfavorable influence rather than a trustworthy evidence of their comparative value under average conditions.

Of those tabulated, Advance, Early Red, La Fayette and Zea are recent seedlings originated by C. Engle of Paw Paw, Michigan, and first planted here in April last.

Of the fourteen varieties ranking in productiveness, as high as five in the scale one to ten, only one, received from Missouri as Infant Wonder, grades as high as eight to nine in quality.

Toquin, a recent Michigan variety, from the town of that name, grades as high as seven in quality.

Barber, an Allegan county seedling; Late Barnard, origin unknown; Lewis, from Allegan county, and Rivers, originating in England, range from six to seven.

Brown, of Berrien county, Michigan; R. S. Stevens, from Western New York, and Salway, of England, grade at six.

Allen and Cleffey *Allen*, place of origin not known, at five.

Bickell, Southern Early, Crosby (from Massachusetts) and Lemon *Free*, origin not known, rank as low as four to five in quality.

Blood Leaf, though productive, is valueless so far as the fruit is concerned, though a curiosity, on account of the dark brownish red color of its foliage.

Arctic and Bokara are on trial with the hope that they may prove unusually hardy and hence better adapted to northern latitudes.

Crane was received, under this name, from Allegan county, but with the understanding that it was identical with St. John. It proves to be a fair yellow peach, though much later than the true St. John.

Crosby has produced far more than the average of this year, with the quality somewhat above medium, while the weight of a specimen is slightly under the average.

Elberta has this year fruited very sparsely. It is reputed generally, to be specially liable to leaf curl. Experience so far would seem to warrant the suspicion that it may fail to permanently maintain its present popularity in our northern climate.

Hinman, as received here, was for a time understood to be identical with Barber. It, however, proves to be distinct, so far as trial trees received here are concerned. Whether or not this is an old variety renamed is yet to be determined.

Hyatt, Hynes, Infant Wonder, Jones, Red Seedling and River Bank are semi-clings of the Hale-Amsden type, differing but slightly, save in season of ripening.

Ice Mountain and Iron Mountain may probably be desirable in a more southern latitude, though so late as to be worthless here. Brett, *Mrs.*, identity doubtful, as received here, is as late as the foregoing, although said to be prized at Newburg, N. Y., where it originated. Strangely enough Downing (Appendix, page 143) gives the leaf glands as both globose and reniform.

June Rose is said to be more recently renamed Superb, by what authority we are not informed.

McCollister still maintains its status for quality, and is confidently commended as the most promising yellow market peach for middle and late September.

Minnie, received from Texas in 1890, ripens here in ordinary seasons early in August, and is of more than medium quality. Another of this name, coming from an unknown source, through the Agricultural College, ripening in late September in ordinary seasons, is of lower quality and less productive.

Sneed and Triumph come to us from the south with high recommendation, but have not yet fruited here. Their alleged earliness may prove less important at the north, since they must compete in the market with the later varieties of the south.

Tallman 1, 2 and 3 come to us as Lenawee county seedlings. Fruit of No. 1 sent for examination was of very high quality and apparently of special value as a variety for the home.

Wager has been received from several sources, but so far we are far from certain that any of them are true to name. The variety is reputed to reproduce itself from the pit. This assumption, if but partially true, may account for the above result.

Worthen *Jennie*, which comes from Texas, proves to be of superior quality here.

GRAPES.—*Vitis.*

The past season has been scarcely as favorable as usual for this fruit, and while all have matured later than usual, several of the later and less hardy varieties have scarcely reached their full color and flavor.

On April 12 to 15 one pound of copper sulphate in 25 gallons of water was applied.

On August 23, mildew having appeared upon a few plants, they were sprayed with a solution of one pound of copper sulphate in 250 gallons of water.

The season throughout, having been unusually dry in this immediate locality, grapes have been quite generally exempt from the attacks of fungi.

The only troublesome insect observed this season is the black aphis, which attacks the tips of the growing canes. In some cases the affected tips have been cut away and burned, while in others they have been subdued by applying a strong decoction of tobacco stems.

The stakes upon which the vines in the southwest block have heretofore been trained have now been replaced by a two-wire trellis, upon which the plants are being trained, on what is commonly known as the Kniffin system.

The unusual exemption from frost, with mild weather and slight rains, till past the middle of November, has resulted in the very general retention of foliage till near the present time (November 24), so that the pruning of grapes, which is usually done in autumn, is yet in progress.

For convenience in consulting and comparing varieties, grapes are arranged alphabetically in a single table, and their species, or parentage, given in a column devoted to that purpose.

In such column the known, or inferred, species of the seed parent is first given; and, in case of actual or inferred hybridization, the species of the actual or supposed pollenating parent is appended with an x.

The usual abbreviations of specific names are employed in such column.

Tabulation of Grapes—Vitis—1897.

Abbreviations—Bunch: c, compact; cy, cylindrical; l, large; o, open; r, roundish; s, shouldered. Berry—Form: l, large; m, medium; o, oval or ovate; r, round; s, small. Color: a, amber; b, black; g, greenish; p, purplish; r, reddish; w, whitish; y, yellowish.

No.	Names.	Species.	Bloomed.	Ripe.	Received from.	Vigor—Scale 1 to 10.	Productiveness—Scale 1 to 10.	Quality—Scale 1 to 10.	Bunch.		Berry.		
									Form.	Weight in ounces.	Form.	Size.	Color.
1	Adirondac	Lab. x Vin.	June 29	m Sept.	Ell. & Barry	6	1	4-5	l c s		r	5-8	b
2	Agawam	Lab. x Vin.	" 30	m Oct.	Hubbard	8-9	3-4	6-7	l o s	5	r	8-9	p b
3	Alice	Lab.			T. J. Dwyer								
4	Aminia	Lab. x Vin.	June 28	b Oct.	Hubbard	10	5	7-8	l s		r	7-8	b
5	August Giant	(Vul. x Lin.) x Vin.	" 29	b Oct.	Hubbard	10	1	5	l s		r	6-7	r b
6	Barry	Lab. x Vin.	" 26	e Sept.	Hubbard	9-10	1	7	r c s	4	r	8-9	b
7	Beagle	(Rip. x Lab.) x Lab.			Munson								
8	Bell	Vul. x (Bour. x Lab.) ?	June 24	e Sept.	Munson	10	10	8	cy r	4	r	8-9	
9	Belvidere	Lab.	" 28	m Sept.	Ag. Col.	8-9	5	4-5	c s	5	r	5-6	b
10	Berckmans	Vul. x (Bour. x Lab.)	" 24	m Oct.	Ag. Col.	10	2	8-9	l s	4	r	5-6	r
11	Berlin	Lab.	" 30	b Oct.	Hosford	7	3	5-6			r	5-6	g w
12	Black Eagle	Lab. x Vin.	" 26	e Sept.	Hubbard	7	5	6-7	l c s	4	r	6-7	b
13	Black Pearl	Vul. x Lab.	" 20	e Sept.	Ag. Col.	10	1	3-4	cy s	2	r	4-5	b
14	Blanco	(Rip. x Lab.) x (Lab. x Vin.)	" 30	m e Sept.	Munson	9	1	6	cy s	4	r	5-6	w
15	Brighton	Lab. x Vin.	July 2	e Sept.	Hubbard	8-10	8	10	l s	6	r	5-6	r
16	Brilliant	Lab. x Vin.	June 30	m Sept.	Munson								r
17	Burnet	Lab. x Vin.	" 30	m e Sept.	Ell. & Barry	8	8	7	c s	4	r	4-5	b
18	Cambridge	Lab.	" 29	e Sept.	Barnhart	8	3		cy s		r	6-7	b
19	Campbell Early	Lab. x Vin.			Josselyn							10	b
20	Catawba	Lab. x Vin.	June 29	e Oct.	Hubbard	8	4	8-9	l s	3	r	6-7	r
21	Caywood, 50	Lab.	July 2	m e Sept.	Caywood	10	2	3-4	l	6	r	5-6	
22	Centennial	Lab. x Vin.	June 30	m Oct.	Campbell	5	10	10	cy s	3	r	3-4	w
23	Challenge	Lab. x Vin.	" 29		Barnhart								
24	Champion	Lab.	" 24	b Sept.	Hubbard	10	8	3	c s		r	4-5	b
25	Chidester, 3	Lab.	" 30	m e Sept.	Chidester	8	1	9	r s		r	3-4	r
26	Chidester, 4	Lab.	" 29	e Sept.	Chidester	9	1	7-8	r	3	r	4-7	r
27	Clark				Div. Pom.								
28	Clevener	Vul. x Lab.	June 30		Barnhart	10	1	4	cy	3	r	4-8	b
29	Clinton	Vul. x Lab.	" 28	b Oct.	Hubbard	10	7	4	cy s	3	r	3-5	b
30	Colerain	Lab.	" 30	m e Sept.	Farmer	10	5	8-9	c	6	r	5-7	l g
31	Columbia	Vul. x Lab.	" 28	m Oct.	E. & B.	7	7	5	l	3	o	6-7	a
32	Columbian	Lab.	" 30	b Oct.	Farmer	10	1	4	l ?		r	10	p
33	Concord	Lab.	" 30	b Oct.	Home	8-10	5-8	5-6	cy s	7	r	5-6	b

34	Cortland	Lab.	" 28	m Sept.	Lambert	10	1	2-3	o s	3	r	5-6	b
35	Cottage	Lab.	" 28	b Oct.	Hubbard	7	4-5	4-5	cy	4	r	4-7	b
36	Creveling	Lab. x Vin.	" 30	e Sept.	Hubbard	10	3	8 9	l		r		b
37	Delaware	Bour. x Lab. ?	" 28	b Oct.	Hubbard	5 6	8 9	10	c cy s	3	r	2 3	r
38	Diamond	Lab. x Vin.	" 29	m e Sept.	Chase	8	2	7 8	l c s	6	r	5 6	w
39	Diana	Lab. x Vin.	" 28	m Oct.	Hubbard	10	1	7-8	c cy	4	r	5-6	r
40	Downing	Est. x Vin.	" 26	m Oct.	Hubbard	4-5	8	8 9	l c s	11	o	7 8	b
41	Dracut	Lab.	Ju'y 1	e Sept.	Hubbard	10	1	2-3	cy s		r	6-8	a
42	Duchess	Lab. x Vin.	June 30	m Oct.	Hubbard	8-9	1	7	l s	6	r	3-4	g
43	Early Golden	Lab. x Vin.			Munson								
44	Early Market	Lab. x Vul.			Munson								
45	Early Victor	Lab. x (Bour. x Lab.)	June 28	m e Sept.	Hubbard	10	10	7-8	c s	3	r	4-5	b
46	Eaton	Lab.	" 26	e Sept.	Hubbard	10	5	4	l s	8	r	7 9	b
47	Elaine	Lab. x Vin.	" 30	m e Sept.	Engle	9	1	7-8	l		r	6-7	r
48	El Dorado	Lab. x Vin.	" 30		Hubbard	7							
49	Elvira	Lab. x Vul.	" 30	m Oct.	Hubbard	10	5	4 5	cy	4	r	5-7	w
50	Empire State	Lab. x Vin.	" 30	m Oct.	Hubbard	10	8	8 9	cy s	6	r	3 4	w
51	Essex	Lab. x Vin.	" 29	m Oct.	Hubbard	8-9	2	6 7	c s	3	o	5-8	r
52	Esther	Lab. x Vin.	" 28	b Oct.	Josselyn	8-9	1	6	cy		r	6-7	w
53	Etta	Lab. x Vul.	" 30	m Oct.	Hubbard	10	5	4 5	c s	7	r	6 8	w
54	Eugenie	Lab.	" 29		Ell & Barry	7			l o		r		
55	Eumelan	Lab. x Vin.	" 28	b Oct.	Hubbard	10	7	8	l s	5	r	5 6	b
56	Eva	Lab.	" 24	b Oct.	Hubbard	7	1	5	c s	2	r	5 6	w
57	Excelsior	Lab. x Vin.											
58	Faith	Lab. x Vul	June 30	m Sept.	Ag. Col.	8-9	1	7-8	cy l s	1	r	4 5	l a
59	Gærtner	Lab. x Vin.	" 28	m Oct.	Hubbard	10	1	5-6			r	6-7	r
60	Geneva	Lab. x Vin.	" 29	m Oct.	Chase	9	3	8-9	l c	2	o	6-7	w
61	Gœthe	Lab. x Vin.	" 30		Hubbard	7			cy s		o	10	y g
62	Golden Drop	(Lab. x Vin.) x (Bour. x Lab.)	" 28	m e Sept.	Hubbard	5	8	9-10	cy s	2	r	3-4	w
63	Golden Gem	(Bour. x Lab.) x Vin.	" 30	b Oct.	Campbell	6	5	10	cy s	2	r	2	w
64	Goldstein	?		Early	Thompson	10			large			large	
65	Guinevra	Lab. x Vin.	June 28	e Sept.	Engle	10	6	6-7	cy c	4	o	6 8	w
66	Hall	Lab.	" 30	b Oct.	Hall	10	5	6-7	c s	4	r	5-7	b
67	Hartford	Lab.	" 28	e Sept.	Hubbard	6-7	1	3-4	l c s	6	r	5-6	b
68	Hayes	Lab.	July 2	m e Sept.	Hubbard	10	1	6-7	cy s	4	r	3 4	w
69	Herbert	Lab. x Vin.	June 29	e Sept.	Hubbard	10	1	6 7	cy s	4	r	6-8	b
70	Honey	Lab. x Vin.	" 30	b Oct.	Engle	8	1	7 8	cy s	4	r	6-7	w
71	Hosford	Lab.	" 30	m e Sept.	Hosford	8	6	5-6	cy s	6	r	9-10	b
72	Iona	Lab. x Vin.	July 2	m Oct.	Hubbard	8-9	9	10	l s	5	o	5-6	r
73	Iris	Lab. x Vin.	" 1	b Oct.	Engle	10	1	5-6	r s		r	6-7	r
74	Isabella	Lab. x Vin. ?	June 26	m e Oct.	Hubbard	10	7	8	l s	4	o	6-7	b
75	Ives	Lab.	" 29	e Sept.	Hubbard	8	10	3-4	cy s	5	r	4-5	b
76	Janesville	Lab.	" 28	e Sept.	Hubbard	10	8	4	r cy s	4	r	5-6	b
77	Jefferson	Lab. x Vin.	July 1	b Oct.	Hubbard	8-9	10	8-9	r cy s	8	r	5-6	r
78	Jessica	Bour. x Lab.	June 26	m Sept.	Smith	8-9	8	6	cy s	4	r	4-5	w
79	Jewell	Bour. x Lab.	" 30	m Sept.	Stayman	7	1	6-7	s	3	r	3-4	b

Tabulation of Grapes, 1897—Concluded.

No.	Names.	Species.	Bloomed.	Ripe.	Received from.	Vigor—Scale 1 to 10.	Productiveness—Scale 1 to 10.	Quality—Scale 1 to 10.	Bunch.		Berry.		
									Form.	Weight in ounces.	Form.	Size.	Color.
80	Josselyn 5, 2, 1		June 29	b m Oct.	Josselyn	10	5	8-9	cy s	4	r	5-6	w
81	Josselyn 7, 2, 1		July 2	m Oct.	Josselyn	10	8	10	cy s	6	r	6-7	w
82	Josselyn 9, 2, 1		June 29	m Oct.	Josselyn	9	1	5-6	cy c	4	r	6 8	b
83	Josselyn 10, 2, 1		July 2		Josselyn	8							
84	Lady	Lab.	June 28	m Sept.	Josselyn	8	9	6	cy	4	r	6-7	w
85	Leader	Lab.	" 29	b Oct.	Josselyn	6	1	5-6	cy o		r	5-6	w
86	Leavenworth	Lab.	" 28	b Oct.	Stayman	10	1	6-7	c s	4	r	6 7	b
87	Lindley	Lab. x Vin.	" 29	e Sept.	Hubbard	9	2	6-7	l s	4	r	5-7	r
88	Lutie	Lab.	" 30	m e Sept.	Parry	9	5	2 3	r	4	r	2-3	r
89	Lyon		" 29	b Oct.	Chidester	10	8	8-9	cy	4	r	7 8	w
90	Mason, *Mrs.*	Lab. x Vin. ?	July 1	e Sept.	Mason	10	1	6-7	r		r	5-6	r
91	Massasoit	Lab. x Vin.	June 28	e Sept.	Hubbard	8	4-5	6-7	r s	4	r	6 8	r
92	Merrimac	Lab. x Vin.	" 30	e Sept.	Hubbard	8-9	2-3	7	cy	6	r	8 9	b
93	Michigan	Lab. x Vin.	" 30	m e Sept.	Engle	10	1	7-8	r cy	3	r	5-6	g w
94	Millington	Lab.	" 29	e Sept.	Palmer	6	1	5	cy c	5	r	7-8	b
95	Mills	Lab. x Vin.	July 1	b m Oct.	Ell. & Barry	8-9	5	10	l cy s	8	r	5-6	b
96	Minnesota	Lab. ?	June 29	m Oct.	Graham	10	1	4-5			r	5 6	w
97	Monroe	(Bour. x Lab.) x Lab.	" 28	m Oct.	E. & B.	10	8	6	l s	4	r	6-7	b
98	Moore Early	Lab.	" 29	m Sept.	Hubbard	9-10	3	5	c s	7	r	7-8	b
99	Moyer	Bour. x Lab.?	" 28	m Sept.	Hubbard	7-8	1	4-5	cy s	3	r	3-4	a
100	Naomi	(Lab. x Vul.) x Vin.	" 22		Hubbard	10	1		l cy s		r o	5-6	l g r
101	Nectar	Lab. x (Bour. x Lab.)	July 1		Caywood	10			cy s		r		b
102	Niagara	Lab.	" 2	b m Oct.	Hubbard	10	1	5-6	c s	7	r	7-8	w
103	Northern Light	Lab.	" 1	b Oct.	Bucke	5-6	1	7-8	cy c s		r	4-5	w
104	Olita	Lab. x Vin.	" 1	b Oct.	Engle	5	2	6	cy c	3	r	4-5	g w
105	Oneida	Lab. x Vin.	June 28		Hubbard	7			o c		r	7-8	r
106	Osage	Lab.	" 28	b Oct.	Stayman	8	1	5	o		r	7-8	b
107	Owosso	Lab.	" 30	e Sept.	Ell. & Barry	10	4	4-5	r cy s	4	r	6-7	p r
108	Ozark	Æst.	July 4	m Oct.	Stayman	10	5	4-5	cy	6	r	5 6	b
109	Peabody	Vul.	June 30	m e Sept.	Campbell	8	8	5-6	l cy	4	r	5-6	b
110	Perkins	Lab.	" 28	b Oct.	Hubbard	10	5	2	c cy s	2	r	6 7	r
111	Pocklington	Lab.	" 30	m Oct.	Hubbard	8	8	6-7	cy s	7	r	7-8	y
112	Poughkeepsie	Bour. x Lab.	" 28	m Oct.	Hubbard	2-3	10	9-10	cy c s	3	r	4 5	r
113	Prentiss	Lab x Vin.	" 30	m Oct.	Hubbard	10	10	7-8	cy c	4	r	6-7	w
114	Presley	(Lab x Vul.) x Lab	" 24	e Sept.	Munson	9	10	4-5	cy c s	3	r	4-5	r

115	Progress (Norfolk?)	Lab. x Vin.	" 30	e Sept.	Stayman	10	3	4-5	r c	3	r	5-6	b
116	Pulpless	Lab. x Vin.	July 1		Engle	9			l s		o	8-9	b
117	Rentz	Lab.	June 26	e Sept.	Hubbard	10	5	3-4	c s		r	5-6	b
118	Requa	Lab. x Vin.	" 28	e Sept.	Campbell	8-9	5	7-8	cy s	6	r	6-7	r
119	Rochester	Lab. x Vin.	" 28	m e Sept.	Ell. & Barry	7-8	4-5	6-7	cy c s	7	r	4-5	r p
120	Rockwood	Lab.	" 30	e Sept.	Josselyn	6	1	7-8	l c s	4	r	3-6	b
121	Rogers 5	Lab. x Vin.	" 28	e Sept.	Hubbard	9	5	7	r c		r	5-7	r
122	Rogers 8 ?	Lab. x Vin.	" 29		Hubbard	10			r c		o		
123	Rogers 24	Lab. x Vin.	" 24	e Sept.	Hubbard	10	6	6-7	c s	6	r	6-7	r
124	Rogers 30	Lab. x Vin.	" 30	b Oct.	Hubbard	10	1	5	o s	3	r	7-8	r
125	Rommel	(Lab. x Vul.) x Vin.	" 30		Munson	8-9			o s		r		g w
126	Salem	Lab. x Vin.	" 30	e Sept.	Hubbard	10	2	5-6	o s	4	r	10	d r
127	Secretary	(Lab. x Vul.) x Vin.	" 28	m Oct.	Ell. & Barry	5	10	8	c s	4	r	4-5	b
128	Telegraph	Lab.	" 30	m Sept.	Hubbard	7	8	5	c s	9	r	6-7	b
129	Themis (incorrect)	Lab. x Vin.	July 2	e Sept.	Engle	9	7	5-6	o s	5	r	6-7	b
130	Triumph	Lab. x Vin.	" 2	Nov.	Campbell	10	7	8-9	l c s	11	r	4-5	g y
131	Ulster	Lab. x Vin.	June 24	m Oct.	Caywood	5-6	9-10	9-10	cy c	5	r	6-7	r
132	Vergennes	Lab.	" 26	e Sept.	Hubbard	7-8	8-9	8-9	l c s	5	r	7-8	r
133	Vesta	Lab. x Vin.	" 29		Engle	9	1	5-6				7-8	w
134	Victoria (black)	Lab.			Josselyn	10	2	6	cy s	5	r	5-6	b
135	Victoria (white)	Lab.	" 30	e Sept.	Campbell	7	1	7	cy s		r o	5-8	w
136	Warder	Lab.	" 30	e Sept.	Huber	5	1	5			r	6-7	b
137	Washington, *Lady*	Lab. x Vin.	July 2	m Oct.	Hubbard	7	1	7	l c s	7	r	5-6	l y
138	Wells ?	Lab.	June 29	b Oct.	Robards	9	5	9		3	o		w
139	White Ann Arbor	Lab	July 1		Scott	7		5	c		r		w
140	White Beauty	Lab. x Vin. ?	June 29	b Oct.	Stayman	8	4	8	cy o		r	4-5	w
141	White Imperial	Lab. x Vin. ?	" 29	b Oct.	Stayman	8	1	7-8	cy l s	2	r	5-6	w
142	Wilder	Lab. x Vin.	" 28	m Oct.	Hubbard	7-8	2	7-8	c s		r	8-9	b
143	Willis	Bour. x Lab. ?	" 28	m Sept.	Campbell	10	1	5-6	c s	5	r	5-6	r
144	Winchell	Lab. x Vin.	" 29	b Sept.	Ell. & Barry	10	8	8-9	l c s	5	r	5-6	w
145	Witt	Lab. x Vin.	" 30	b Oct.	Campbell	10	4	7-8	c s		r	5-9	w
146	Woodruff	Lab. x Vin.	" 24	m Oct.	Scott	8-9	5	4-5	r s	4	r	7-8	r
147	Worden	Lab.	" 26	m e Sept.	Hubbard	10	3	7-8	l s	6	r	7-8	b
148	Wyoming	Lab.	" 30	m e Sept.	Hubbard	8-9	2	4	l s	3	r	5-6	r

Of many varieties, plants of fruiting age have proved unproductive during the past season: a result perhaps due, in whole or in part, to unseasonably cold winds from Lake Michigan during the blossoming season.

Unseasonably cool weather also occurred during the season of ripening, which was from two to three weeks later than usual. Owing apparently to these facts, certain varieties have failed to fully develop their usual quality.

Adirondac originated at the foot of the Adirondac mountains, near Lake Champlain. It was first brought to notice by the exhibit of beautiful, ripe, luscious clusters at a meeting of the American Pomological Society, at Boston, and a report of the committee on native fruits commended it very highly, but away from its original locality it has generally proved a decided failure.

Agawam, alphabetically, leads the entire list of the Rogers' hybrids, of which seventeen appear in the foregoing tables. While they afford a surprisingly high average result of a single set of pollenations of *vinifera* upon our wild *labrusca*, it is doubtful if any of them possess qualities which will insure their permanent popularity. With these, as well as (with rare exceptions) with all hybrids with *vinifera*, the increased liability to mildew in many if not most American climates, demands more careful and thorough preventive treatment than most cultivators are accustomed to bestow.

To this as to most general rules, experience here would indicate occasional exceptions. Among such we especially note the Downing, which, although in foliage and habit of growth giving decided evidence of *vinifera* parentage, has proved healthy and productive, of very large clusters, of superior quality, often keeping in good condition till March, with only ordinary care. Much the same may also be said of Jefferson and Mills.

Brighton, though slightly liable to mildew, is so admirable in quality as to richly deserve a place in the home plantation. It needs the proximity of some other variety as a fertilizer.

Delaware is, by many experts, believed to be partially of *vinifera* parentage. Here it has proved healthy and productive, although experience elsewhere would indicate that it may be fastidious as to soils or modes of treatment.

Beagle, Bell, Blanco, Brilliant, Early Market, Presley and Rommel are seedlings by T. V. Munson, the noted expert of Denison, Texas. Several years trial indicates that they are not adapted to the climate of this locality.

Berlin, white, and Hosford, black, are seedlings originated by George Hosford of Ionia, Michigan. They are understood to be of pure *labrusca* parentage (Concord seedlings), and experience so far affords promise of value as market varieties.

Chidester 3, purple, and Chidester 4, red, received in 1892; also Lyon, white, received in 1895, are seedlings by C. P. Chidester of Battle Creek, Michigan. No. 3 is very early, and Lyon is large, beautiful and of fine quality. All are healthy and vigorous.

Elaine, Guinevra, Honey, Iris, Michigan, Olita, Pulpless and Vesta are seedlings by C. Engle of Paw Paw, Michigan. All are understood to be from seeds of Salem, or some other of the Rogers' hybrids, and hence to belong with the family, *lab.* x *vin.* Many of them manifest more or less strongly the distinctive characteristics of that family. Further trial is needful to properly determine their relative value.

Alice, received from T. J. Dwyer of Cornwall, N. Y., in 1896, and Goldstein, originating in Mississippi, and received from Thompson's Sons of Rio Vista, Virginia, in 1897, appear to be healthy and vigorous, but, of course, are not yet fruiting.

Campbell Early was received from Geo. S. Josselyn of Fredonia, N. Y., the introducer, who also sent specimens of the fruit when at maturity. The growth of spring set plants, as well as the character of the fruit received, indicate that it will probably sustain the high character given it by its originator, Geo. W. Campbell of Ohio.

Plants of four varieties, Josselyn No. 5, white; No. 7, white; No. 9, black; and No. 10 (not yet in fruit) were received from Mr. Josselyn in 1891. These rank from 8 to 10 in vigor, and the first three appear promising as market varieties.

Esther and Rockwood, received from the same source in 1892, are both above medium in quality; productiveness yet undetermined.

Plants of a seedling originating with Mrs. Mason of Ottawa county, Michigan, were received for trial in 1892, and have now fruited. The bunch is small, compact; berry, dark reddish amber and of fair to excellent quality.

Victoria, the white variety originated by the late T. B. Miner, was received in 1892 from Geo. W. Campbell of Ohio. A variety under this name, but black in color, has been received from two or three other sources. It is apparently not Ray's Victoria, which is light amber in color.

PLUMS.—*Prunus.*

The pruning of plums was commenced on March 20th and continued from time to time as weather permitted. The work was completed on March 27th.

Examination by Prof. Taft betrayed the presence of Putnam scale upon several plum trees, on March 31st these being yet dormant were sprayed with kerosene emulsion, consisting of one-fourth kerosene as applied to a part of the trees, and one-sixth kerosene as applied to others. Owing to strong wind, the emulsion could only be applied to one side of the trees at this time.

On April 1st and 2d the remaining plums were treated with emulsion consisting of five gallons of kerosene, six pounds of whale oil soap and forty gallons of water.

On June 26th large numbers of aphides were discovered upon several plum trees. These were treated with a strong decoction of tobacco. This so far stupified them that they dropped to the ground, apparently dead.

They, however, recovered after several hours, and started to resume their attack upon the foliage, but were treated this time with emulsion, composed of a gallon of kerosene and a gallon of whale oil soap in fifty gallons of water, which proved effectual.

July 1st and 2d shot-hole fungus and also brown rot of the fruit appearing upon several plum trees, they were sprayed with Bordeaux mixture, using four pounds of copper sulphate and six pounds of stone lime, in fifty gallons of water.

July 22d several plum trees bearing heavy crops of fruit were thinned, and as the fruit on two or three of them was becoming shriveled, owing to extremely hot weather and severe drouth, they were copiously watered by drawing back the earth, and forming a basin about the trunk, filling the same with water, and replacing the earth after the water had been absorbed. Within a few hours the fruit resumed its original plumpness.

Jarring for curculio was commenced on May 29th, finding a few only. This was repeated frequently, so long as considerable numbers of insects were caught. They have not occurred in large numbers this year.

The rose chafer has been almost wholly absent this season.

The aphis has been unusually abundant and persistent, especially upon the plum.

Tabulation of Plums—Prunus—1897.

Abbreviations—l, long; o, oval; ob, oblate; r, roundish; b, black; g, greenish; p, purple; r, red; w, whitish; y, yellowish; c, cling; f, free; s, semi-cling.

No.	Names.	Species.	Planted.	Vigor—Scale 1 to 10.	Bloomed.	Ripe.	Form.	Color.	Adhesion.	Weight of specimen in ounces.	Productiveness—Scale 1 to 10.	Quality—Scale 1 to 10.	Remarks.
1	Abundance	Triflora	1895	9-10	May 7	Aug 21	r o	r			1	5-6	Very productive as the name implies.
2	Agen	Domestica	1890	6-7	" 8	Sept. 6	o	p	f	1	1	6-7	Old. Now largely superseded.
3	Arch Duke	Domestica	1897	8-9	" 8	" 6	r o	b	f	2	6	3-4	Not yet fully tested here.
4	Arctic	Domestica	1890	8-9	" 8	Aug. 27	r o	b	f	1	6	5	Named for alleged hardiness.
5	Bailey	Triflora	1897										Not yet fruited here.
6	Bavay	Domestica	1890	7-9	May 7	Sept. 30	r	g y	c	2	5	10	Reine Claude of nurseries—erroneously.
7	Berckmans	Triflora	1897										Not yet fruited here.
8	Black Diamond	Domestica	1892	9	May 8	Sept. 8	o	b	f	2	3	5 6	A large, promising market plum.
9	Black Prune	Domestica	1888	5-6	" 8								Not sufficiently tested here.
10	Botan	Triflora	1890	9	" 4	Aug. 21	r o	r			1	5-6	Abundance is identical with this.
11	Bradshaw	Domestica	1890	9-10	" 8	" 25	o ob	p b	f	2	1	6-7	A leading market plum.
12	Burbank	Triflora	1893	10	" 5	" 26	r o	y r	c	2	4	6	Tree vigorous, spreading, productive.
13	Clyman	Domestica	1894	7									Not yet fruited here.
14	Coe *Golden Drop*	Domestica	1893	8-9	May 9	Sept. 28	o	y	c	2	1	8	Late, excellent, productive.
15	Columbia	Domestica	1893	8	" 8	Aug. 27	r	p	f	2	1	7-8	Large, beautiful, good.
16	Cook	Hortulana	1890	8	" 11	Oct. 6	r						Valueless here.
17	Czar	Domestica	1892	8 9	" 8		r o	p	f	2	1	7-8	But partially tested here
18	Csaszar Szilva	Domestica	1895										Introduced from Austria-Hungary.
19	Dr. Uff	Domestica	1894	5									From above source.
20	Dr. Uff Szilvaja	Domestica	1895	3	May 10								From above source.
21	Dunlap	Domestica	1896										Not yet fruited here.
22	Elwood		1896	10									Not yet fruited here.
23	Engle	Domestica	1890	8	May 8	Aug. 18	r o	y	f	1	8	7-8	Excellent, but too small.
24	Englebert	Domestica	1890	9-10	" 8	Sept. 6	r o	b	f	1	5	6-7	Market. A Belgian seedling.
25	Fellenberg	Domestica	1896										Italian Prune of Downing.
26	Field	Domestica	1892	9 10	May 8	Aug. 27	o	b	c	1	5	6-7	Needs further trial.
27	Foot	Domestica	1896	5									Not yet fruited here.
28	Forest Garden	Americana	1889	5 6	May 11	Sept. 25	r						Not desirable here.
29	Forest Rose	Hortulana	1890	5	" 12	Oct. 15	r						Not desirable here.
30	Freestone Quetsche	Domestica	1894	7-8									Imported by Division of Pomology.
31	French Damson	Domestica	1893	10	May 8	Sept. 20	r	b	c	1	1	7	Not fully tested here.
32	French Prune	Domestica	1894	10	" 10								Not fully tested here.
33	Garfield	Hortulana	1889	9	" 13								Southern. Worthless here.

Tabulation of Plums—Prunus—1897—Concluded

No.	Names.	Species.	Planted.	Vigor—Scale 1 to 10.	Bloomed.	Ripe.	Form.	Color.	Adhesion.	Weight of specimen in ounces.	Productiveness—Scale 1 to 10.	Quality—Scale 1 to 10.	Remarks.
34	Giant Prune	Domestica	1895	8	May 10	Sept. 21	o	p	f	2	1	6 7	New. Needs further trial.
35	Glass	Domestica	1890	9	" 7	Aug. 31	r	b	c	2	1	6-7	First fruited here this season.
36	G. No. 4	Domestica	1890	9-10	" 8	" 31	r	p	c	1	1	7-8	From New York. So far unproductive.
37	Gold	Triflora	1895	6-7	" 17								Seedling by Luther Burbank.
38	Golden Prune	Domestica	1894										Not yet fruited here.
39	Grand Duke	Domestica	1890	8-9	May 6	Sept. 9	o	p b	c	3	2	4-5	Very promising for market.
40	Geuii	Domestica	1890	9	" 8	" 2	r	p	f	1	9	5-6	A popular market plum.
41	Hale	Triflora	1896	10									Japanese. Not yet fruited here.
42	Hawkeye	Americana	1888	8									One of the best of this species.
43	Hungarian	Domestica	1888	10	May 8	Aug. 31	r	p	f	1	2	6-7	Identity yet rather uncertain.
44	Jewell	Americana	1890	5	" 12								Not valuable here.
45	Kelsey	Triflora	1890	8	" 19								Will not ripen here.
46	Kerr	Triflora	1897										Japanese. Not fruited here.
47	Kingston	Domestica	1890	10	May 7	Sept. 2	o	b	c	2	8	6	Very promising. Market.
48	Korai Quetsche	Domestica	1894	8-9									Hungarian. Not yet in fruit here.
49	Large Green	Domestica	1894	5									Not yet in fruit here.
50	Lincoln	Domestica	1890	7-8	May 8	Aug. 21	r o	r p	f	2	1	8	So far, lacks productiveness.
51	Lombard	Domestica	1890	8 9	" 8	" 31	r	p	c	1	10	5	Less valued than formerly.
52	Long Fruit	Triflora	1890	10	" 7	" 2	r	r	f		1		Identical with Yosebe.
53	Lyon	Domestica	1890	9-10	" 8	Sept. 7	r	g w	f	2	1	7-8	Renamed thus by Mich. Hort. Society.
54	Mammoth Prune	Domestica	1895						f				Not yet fruited here.
55	Marianna	Cerasifera	1890	10	May 7	Aug. 21	o	r	c		1	6-7	Unproductive. Only valued for stocks.
56	Marshall	Domestica	1892										Not yet fruited here.
57	Maru	Triflora	1890	8	May 6	Aug. 27	r	r	c	1	10	5	Over productive. Needs thinning.
58	Marunka	Domestica	1888										Russian. Lacks productiveness.
59	McLaughlin	Domestica	1893	3-4	May 8								Not yet fruited.
60	Middleberg	Domestica	1890	8-9	" 8	Sept. 23	r o	y	f	1	9	8	Late. Market.
61	Miner	Hortulana	1890	9	" 12	Oct. 6							Not valuable here.
62	Mikado	Triflora	1897										Not fruited here.
63	Mistake	Domestica	1896	7-8	May 17								Not fruited. Name objectionable.
64	Moldavka	Domestica	1888	9	" 8	Sept. 6	o	y	f	2	1	6-7	Russian. Lacks productiveness.
65	Monarch	Domestica	1893	9	" 7	" 27	o	p	f	2	4	7	Highly promising.
66	Moreman	Hortulana	1890	10	" 12	Aug. 6	ob	r	c	1	4	6	Among the finest of the species here.
67	Murdy	Domestica	1892	9	" 10	Sept. 23	r o	p	c	3	1	7-8	Not yet properly tested.
68	Muscat *Free*	Domestica	1894	6-7									Hungarian. Not yet fruited.

69	Newman	Angustifolia	1890	8	" 18	Oct. 6							Lacks value here.
70	Nicholas	Domestica	1890	9	" 10	Sept. 6							Requires further trial.
71	Odell	Domestica	1896										Not yet fruited here.
72	Ogon	Triflora	1890	9-10	May 7	Aug. 3	r	y	f	1	10	2-3	Productive, showy, poor.
73	Orel, 20	Domestica	1888	7-8	" 8								Not yet fruited.
74	Pottawattamie	Hortulana	1894	10	" 10								Value here very doubtful.
75	Prairie Flower	Hortulana	1890	5-6	" 12								Worthless here.
76	Red June	Triflora	1894	10	" 6	Aug. 16	r o	r p	c	2	4	8 9	So far, the best of this species.
77	Red Nagate	Triflora	1890	9-10	" 8	" 31	r o	r	c	2	9	5 6	Only second to the foregoing.
78	Robinson	Angustifolia	1890	9-10	" 10	" 27	r	r	c	1	9	5	The most productive native here.
79	Saratoga	Domestica	1890	10	" 8	" 26	r o	r	c	2	1	6 7	Beautiful and good; market.
80	Satsuma	Triflora	1890	10	" 3	" 31	r o	p	c	2	2	7-8	Excellent; culinary variety.
81	Sargent *Robe*	Domestica	1893	8-9	" 10								Not yet fruited here.
82	Shipper	Domestica	1890	10	" 8	Aug. 30	o	b	c	2	4	5 6	Market only.
83	Shiro Smomo	Triflora	1890	9	" 3	" 4	r o	r p	c	1	10	5-6	Too productive; must be thinned.
84	Shropshire	Domestica	1890	10	" 8	Sept. 27	r o	b	s	1	4	6-7	One of the numerous Damsons.
85	Silassy	Domestica	1894	7									From Hungary; not fruited.
86	Simon	Simoni	1888	8	Apr 30		ob	y r					Large, showy; scarcely eatable.
87	Simpson	Domestica	1896	8									Not yet fruited here.
88	Spanish *King*	Domestica	1890	9-10	May 8	Aug. 26	r	p	c	1	10	4-5	Promising; market.
89	Spaulding	Domestica	1890	8 9	" 8	Sept. 6	o	y	c	1	1	8 9	Requires further trial.
90	Splendor	Domestica	1895	8	" 17								Not yet fruited here.
91	Stark *Gage*	Domestica	1894	10	" 13								Not yet fruited here.
92	Steptoe	Domestica	1895	10	" 15								A Pacific coast prune.
93	Szillassy Piros	Domestica	1895										Imported from Hungary.
94	Throop	Domestica	1895	10	May 17								New; not yet fruited here.
95	Van Buren	Americana	1890	3-4	" 12	Sept. 27	r	r y	f	1	5	5 6	Worthless here.
96	Victoria	Domestica	1890	8-9	" 10	Aug. 27	o	r	f	2	3	6 7	Promising for market
97	Violette	Domestica	1896	3-4	" 7								Old; not yet fruited here.
98	Wales *Prince*	Domestica	1892	7-8	" 8	Sept. 9	o						Not yet fruited here.
99	Wangenheim	Domestica	1890	10	" 10	Aug. 27	o	b	f	1	8	5	Productive; German.
100	Weaver	Americana	1890	7-8	" 10								Not desirable here.
101	White Kelsey	Triflora	1897										Not fruited here.
102	White Queen	Domestica	1894	8 9									Not fruited here.
103	Wickson	Triflora	1895	9 10	May 7			r					Very large; productive; good.
104	Willard	Triflora	1894	7-8	" 10								Not yet fruited here.
105	Wyant	Americana	1890	8	" 12	Sept. 25	r o	y r	f	1	3	7 8	Better farther west.
106	Yellow Aubert	Domestica	1888	9-10	" 8	" 8	o	y	c	2	1	7	A Russian importation; promising.
107	Yellow Egg	Domestica	1893	10	" 8	" 23	o	y	c	2	1	4 5	Old; very large; market
108	Yosebe	Triflora	1890	10	" 7	July 24	r	r	f	1	1	2 3	Small; the earliest plum.
109	Yosemite Yellow	Americana	1892	5	" 10	Sept. 30		y					Not desirable here.
110	Youngken *Golden*	Domestica	1896	7									Not yet fruited here.

PRUNUS.—*Americana.*

This species has heretofore been understood to include the entire group of wild, native varieties, except those classed as *chicasa*. but the more recent introduction of many such varieties to cultivation has betrayed such wide differences of important characteristics that the process of segregation is in progress, though perhaps not yet complete.

Of those tested here, grouped as *angustifolia:*

Newman is but partially tested, and must be regarded as of doubtful value.

Robinson is one of the most profitable of the *Americanas*, though by no means comparable with many of the *domesticas* for localities, in which the latter are successful.

Of those designated as *cerasifera:*

Marianna, only, is under trial here. So far it is a vigorous grower, but exceedingly unproductive. Here it does not propagate readily from cuttings, as is said to be the case farther south.

Of those grouped as *hortulana:*

Moreman is beautiful and of good quality. Here it is the best of this group, though none of them are valuable.

PRUNUS.—*Domestica.*

This is the species heretofore chiefly grown in Michigan. It includes European varieties, together with seedlings of this type originating in America. Of these Bavay, Black Diamond, Bradshaw, Shipper and Yellow Egg have been long and thoroughly tested, and may safely be extensively planted for commercial purposes.

The following, though less thoroughly tested, may be regarded as worthy of extensive trial for the same purpose, viz: Arch Duke, Field, Grand Duke, Kingston, Middleburg, Monarch, Murdy, Saratoga, Spanish *King*, Victoria and Yellow Aubert.

Bavay, Coe, Columbia, Lincoln and McLaughlin are varieties well adapted to planting in the home plat.

Nearly thirty of the tabulated varieties of this species have either not yet fruited, or have borne too lightly to suffice for adequate description.

PRUNUS.—*Simoni.*

The form known as Simon or Apricot plum is large and showy. It is said, farther south, to be of tolerable quality, but here its quality is so low as to render it worthless, save, perhaps for exhibition purposes.

PRUNUS.—*Triflora.*

The above seems now to be generally recognized as the appropriate and preferred specific name of the group known as Japanese plums, which were, for a time, designated as *hattan*.

Abundance is a name applied to what was previously known as Botan, a name which, according to the rules of pomology, is entitled to precedence.

Burbank, and yet more recently, Red June, are largely superseding the Botan in popularity. Red June seems likely to win precedence on account of its slightly improved quality, large size, and especially the more satisfactory habit of the tree, which is upright, while Burbank is spreading and almost drooping.

Kelsey fails to mature its wood within our season. It is only adapted to the climate of California and the extreme south.

Long Fruit and Yosebe, as received from Georgia, are obviously identical. The fruit is very small and of indifferent flavor, usually ripening about the middle of July.

Maru and Shiro Smomo in form and color are much like Botan, though of smaller size and earlier. They are excessive bearers.

Ogon is of good size and bears moderately, but the fruit, though beautiful, is sadly deficient in quality.

Red Nagate, as received from Georgia, is much like Red June, though somewhat less in size and otherwise distinct.

Satsuma, owing to its color, is frequently gathered before full maturity. Here it is sufficiently productive, and when fully matured is one of the best of the species for culinary purposes. Trees received here as Chabot have now fruited and prove identical with the above.

Trees received as Gold, Hale, Kerr, Mikado and Willard have not yet fruited.

Wickson showed more or less bloom last spring, but failed to fruit this year, though maturing a few fine specimens last year upon year old grafts.

PEARS.—*Pyrus communis.*

The cold, backward spring of 1897 held pears, in common with other fruit trees, in a dormant condition much later than usual, and while in this condition they, in common with other trees, received a thorough spraying, the needful pruning having been done during mild weather in early March.

June 1st and 2d gave pears a spray of Bordeaux, adding three ounces of Paris green to each barrel of water, as a preventive of scab and codling moth.

June 18th sprayed pears with copper sulphate (one pound in 50 gallons of water) to prevent scab, adding three ounces of Paris green for codling moth.

July 6th repeated the foregoing for the same purpose.

July 26th, drouth being very severe, several young pear trees, which had become seriously enfeebled, were treated with two quarts of bone meal, one quart of nitrate of soda and one peck of ashes. The whole was well mixed with the soil about the trees which were then thoroughly watered.

Crimson clover was sowed among pears on August 2d and 3d after a moderate shower. This started promptly, but the immediate occurrence of hot, drying weather ruined much of it, except where more or less shaded. The stand of plants is therefore more or less imperfect.

August 14th the *slug* having attacked the foliage of a few pear trees; they were dusted with air-slaked lime.

Several pear trees were at different times attacked by blight, which was promptly cut away and burned. Only in one or two cases has it become necessary to wholly remove the trees.

TABULATION OF PEARS—*Pyrus Communis*—1897.

Abbreviations.—Season, months—b, beginning; e, end; m, middle. Form—i, irregular; o, oblate; ob, oblong; obo, obovate; obt, obtuse, ov, ovate; p pyriform; r, round; t, turbinate. Color—b, brown; c, crimson; g, greenish; r, red; ru, russet; w, whitish; y, yellow. Texture—b, buttery; f, firm; g, granular; m, melting; t, tender. Flavor—a, acid; as, astringent; j, juicy; s, sweet; v, vinous; p, perfumed. Use—d, dessert; k, kitchen; m, market.

Number.	Names.	Planted.	Bloomed.	Season.	Vigor.—Scale 1-10.	Origin.	Ounces.—Weight.	Form.	Color.		Texture.	Flavor.	Quality.—Scale 1-10.	Use.
									Skin.	Flesh.				
1	Alphand	1892			6									
2	Angouleme	1891	May 8	Oct.	9	France	12	ob obo	y ru	w	b m	j v	5-6	m
3	Anjou	1888	" 8	e Oct.	8 9	France	10	ob p	y ru	w	m	j v p	8-9	d m
4	Ausault	1889	" 12	e Sept.	5 6	France	6	obo obt p	y ru	w	m	s v	5-6	m
5	Ayer	1896												
6	Barry	1892	May 15	Dec.	8	California	6	p	y ru	w	m	j s v	5-6?	d m
7	Bartlett	1891	" 10	m Sept.	8	England	7	obo obt p	y ru	w	b t	v p	6-7	d m
8	Bartlett Seckel	1894			7	America								
9	Baudry	1895			5									
10	Beauty *Sum*	1895			10	Texas								
11	Bloodgood	1888	May 8	m Aug.	9 10	New York	4	t obo	y ru	y w	b m	s p	5-6	d
12	Bordeaux	1892			10	France								
13	Bosc	1888	May 12	e Oct.	7 8	Belgium	10	pi	y c ru	w	m b	j p	10	d m
14	Boussock	1891	" 12	b Oct.	9	Belgium	8	r obo	y ru	w	b m	j s p	5-6	m
15	Brandywine	1888			10	Delaware								
16	Buffum	1891	May 17	m Oct.	10	Rhode Island	6	obt obo	y	w	t b g	j s	5 6	m
17	Clairgeau	1891	" 10	e Sept.	6-7	France	6	pi	y c ru	y	b g	s p v	4-5	m
18	Clapp *Favorite*	1888	" 12	b Sept.	10	Massachusetts	9	t	y b ru	w	b m	s v	6-7	d m
19	Col. Wilder	1896			6-7	California								
20	Comice	1891	May 8	m e Oct.	9	France		r obt p	g b	w	b m	j s p	8 9	d m
21	Congres	1890	" 12	e Sept.	10	France	12	r obt p	y r	w	b m	j p	5 6	m
22	Dana Hovey	1888	" 13	Oct. Nov.	9-10	Massachusetts	4	obo obt p	y ru	y	m	j s p	10	d
23	Dearborn	1891	" 13	b Sept.	10	Massachusetts	5	r p	y	w	m	j s	8-9	d
24	Desportes	1891			9	France	2	obo obt p	g y r	y w	m g	j s a		
25	Dorset	1895			9							j v		
26	Drouard	1890			10	France ?								
27	Duhamel	1891	May 8	m Oct.	7	France	4	obo obt p	y ru	w	m g	j s	7-8	d ?
28	Early Duchess	1892	" 1[illegible]	b Oct.	8	France	7	obo obt p	y r c	w	t b m	j v	6-7	m
29	Edmonds	1889	" 17	Oct.	9 10	New York	5	obo obt p	g y	w	f m	j s	5-6	m
30	Elizabeth, *Manning*	1891	" 8	e Aug.	10	Belgium	3	r obo	y r	w	m	j s p	8 9	d
31	Esperen	1891	May 8	m Oct.	10	Belgium	5	r obt p	y c	w	g m	v j	4-5	m
32	Fitzwater	1891	" 10	b Oct.	7	New York	4	obo obt p	y ru	w	g m	s	8 9	d
33	Flemish	1891	" 17		10	Belgium		obo obt p	y r ru	y w	f m	s j p	5 6	m
34	Fox *B. S.*	1892			6 7	California								
35	Fred Clapp	1888	May 13		9-10	Massachusetts								

36	Gakovsk	1888	" 8	m Aug.	5	Russia	3	p	g y		b	v	4	m
37	Gansel *Seckel*	1892			9	England								
38	Garber	1894			10	America								
39	Giffard	1888	May 8	m Aug.	9	France	4	p	y r ru	w	m	v	9-10	d
40	Gray Doyenne	1888	" 8	b Oct.	7	France ?	5	ov obo	c ru	w	b m	v	8-9	d
41	Groveland	1890			5-6	Alabama								
42	Grumkower	1891			7-8	Europe								
43	Hardy	1888			10	?								
44	Henry	1896			8-9	Illinois ?								
45	Heyst *Emile*	1893			7	Belgium								
46	Hoosic	1888			9	Massachusetts								
47	Howell	1888	May 10	m e Sept.	8	Connecticut	8	r p	y ru	w	m	v j	5-6	m
48	Idaho	1893			9	Idaho								
49	Jones	1889	May 15	Oct.	8	Pennsylvania	3	cbo p	y c ru		g b	s v	5-6	d
50	Josephine	1890	" 10	m Oct.	10		7	r ov obt	y c ru	w	b m g	s	8-9	d
51	Keiffer	1891	" 4	e Oct.	10	Pennsylvania	6	r obt p	y c ru	w	m g	v	4-5	m
52	Koonce	1895			8	Illinois								
53	Kentucky	1891			10	Kentucky ?								
54	Kraus 18	1895			7	New York								
55	Kraus 41	1895			8	New York								
56	Lady *Clapp*	1895			5	Massachusetts								
57	Lawrence	1888	May 12	Nov., Dec.	7-8	New York	5	obo obt p	y ru	w	m	s j p	8-9	d m
58	Lawson	1889	" 10	m Aug.	10	New York	5	obo p	y r	w	b	s	3-4	m
59	Lincoln	1894			8-9	America								
60	Longworth	1891			10	Ohio ?								
61	Louise *Jersey*	1891				France								
62	Lucrative	1888	May 12	m e Sept.	8	Europe	6	obo p	y ru	w	m	j s	8-9	d m
63	Lucy Duke	1892	" 13		9									
64	Margaret	1889	" 10	e Aug.	8-9	Ohio	1	obo	y g	w	t b	j v s	8	d
65	Marguerite *Petite*	1889	" 10	b Aug.	8-9	France	2	o obt p	g y b	w	b m	j s p	5-6	d
66	Marshall	1893			9-10	New York								
67	Mas *Pres.*	1896				Belgium								
68	Maynard	1896				Pennsylvania								
69	Millett *Mad.*	1891	May 8	Nov., Jan.	8-9	Europe	7	r obo	y ru	w	f	v		
70	Mount Vernon	1888	" 8	Nov.	9	Massachusetts	6	r obt p	y b ru	y	g m	v j p	5-6	k m
71	Ogereau	1891	" 8	m Oct.	9	Europe?	9	ob obt p	y r	w	b	j v	6-7	m
72	Olivier	1895				France								
73	Onondaga	1891	May 12	e Sept	10	New York	6	ov obo obt p	y ru	w	g b	v j	7	m
74	Osband	1891			9	" "								
75	Pitmaston	1891	May 12	e Oct.	10	England	17	ob obo p	y ru	y w	m b	v j	7-8	m
76	Reeder	1890	" 8	m Oct.	9	New York	8	r ov obt p	y ru	w	m b g	j s v	8-9	d m
77	Reliance	1893			8-9	America?								
78	Rostiezer	1888	May 11	e Aug.	9-10	Europe	3	obo p	y b ru	w	m b	s p	10	d
79	Rutter	1892	" 8	b Oct.	10	Pennsylvania	9	r p	y ru	w	f g m	s v	7	m
80	Seckel	1888	" 12	b m Oct.	8-9	"	3	obo	g b ru	w	b m	s v p	10	d

TABULATION OF PEARS, 1897.—*Concluded.*

Number.	Names.	Planted.	Bloomed.	Season.	Vigor.—Scale 1-10.	Origin.	Ounces—Weight.	Form.	Color.		Texture.	Flavor.	Quality.—Scale 1-10.	Use.
									Skin.	Flesh.				
81	Seneca	1894			8	New York?								
82	Sheldon	1890	May 10	m e Oct.	10	" "	4	r obo	y b ru	w	m	j s v p	7 8	m
83	Sterling	1888	" 8	e Aug.	10	" "	5	r ov	y c ru	w	m	j s	5-6	m
84	Stout	1896				America?								
85	Sudduth	1896			5	Illinois								
86	Summer Doyenne	1888	May 12	b Aug.	8-9	Belgium	2	r obo p	y r	w	m	j s	4-5	d
87	Superfin	1891			10	France								
88	Tyson	1888			10	Pennsylvania								
89	Van Cott	1893			5									
90	Vermont	1894			8	Vermont								
91	Vicar	1891			10	France								
92	Victor	1891	May 17		10									
93	Wilder *Early*	1889	" 15		8	New York								
94	Winter Nelis	1888	" 13	Nov , Dec.	7-8	Belgium	4	r obo	y g ru	y w	b m	j v p	10	d m
95	Worden *Seckel*	1896			5	America?								
96	Zache	1894	May 12	e Oct.	10	?	10	r o	y	w	g	s	2-3	k

The following varieties are named, as nearly as practicable, in the order of their ripening. The list includes the *cream* of those fruited here and known to be generally successful in this state, and well worthy of a place in the home plantation, viz: Summer Doyenne, end of July; Bloodgood, b August; Giffard, m August; Margaret, e August; Rostiezer, b September; Clapp *Fav.*, b m September; Lucrative, e September; Elizabeth *Manning*, September; Seckel, October; Bosc, October; Comice, October, November; Anjou, October, November; Dana Hovey, November, January.

The following can be relied on to supply a market with a succession of varieties of fair quality and attractive appearance during the usual season, viz: Clapp *Fav.*, b m September; Bartlett, m e September; Boussock, September, October; Howell, September, October; Angouleme, October; Bosc, October; Sheldon, October; Anjou, October, November; Ogereau, October, November; Rutter, October, November; Reeder, November; Clairgeau, October, December; Mount Vernon, November, December; Lawrence, December; Winter Nelis, December, January.

Ansault (Bonne du Puits Ansault) is a fine pear of medium size and quality. Is, so far, a profuse and constant bearer, and must be severely thinned to maintain the health and vigor of the tree. Promising for market.

Coreless. Trees received from a Missouri nursery, under this name, bore a fine crop of fruit last year and proves to be identical with Flemish.

Bessemianka, Gakovsk, Kurskaya and Victorina are Russian varieties of low quality and valueless here.

Congres (Souvenir du Congres), though of only medium quality, is very large and beautiful under favorable conditions, but severe pruning and thinning, together with intensive culture will be found indispensable to the realizing of such result.

Trees of Fitzwater pear, planted in 1891, made fairly vigorous, healthy growths for several years, but from some unknown cause they have made but feeble growth during the last two years. Copious watering during drouth, together with the application of special fertilizers, have been resorted to with apparently promising effect.

Lawson, popular for a time in eastern New York as a market variety, has fruited here this year. Its fine size and beautiful color are its chief merits.

Onondaga ripens after the plethora of autumn fruits is past, and deserves a place in both the home and the commercial plantation as a fair dessert pear, and especially as a culinary variety.

Wilder Early, which has received high praise in certain localities, proves here to be a tardy bearer. It bloomed for the first time last spring, but failed to mature fruit.

Winter Nelis must have rich soil, and should not be allowed to overbear if its usual high quality is to be maintained.

Barry, *P. Barry*, is a comparatively recent California seedling, and an unusually long keeper. It promises unusually well as a late winter pear of high quality, but will probably require to be ripened in a warm room with special care to avoid shriveling. The tree is a straggling grower.

Pyrus sinensis.

There are but one or two varieties of this species on trial here, and these have been included in the foregoing list, rather than tabulate them separately.

Zache possesses the long slender stem, the oblate form, and the firm, coarse, granular flesh which usually characterize this species, and for that reason is assumed to be of pure *sinensis* parentage. It will be desirable, if at all, for culinary uses. Like certain others of the species, the very large, rich, glossy foliage, may even render it desirable as an ornamental tree.

Keiffer possesses peculiarities of both tree and fruit, which indicate a probable hybridization, with *sinensis* as one of the parents. If valuable at all in Michigan it is for strictly commercial purposes, upon quick, warm soils and to catch the trade of those who are won by looks rather than quality. Farther south, with longer seasons, it is improved in beauty, size and perhaps even in quality.

APPLES.—*Pyrus.*

The pruning of apples was commenced on March 29, and completed on or about April 3.

On June 2 apples (and pears also) were sprayed for scab and codling moth, using Bordeaux of ordinary strength, with three ounces of Paris green in each 40 gallons of the mixture. The spray with this mixture was repeated on June 18 for the same purpose, and was again applied on July 6 to 8.

The green aphis has been but slightly troublesome upon the apple, though a few were discovered, mostly upon small trees. These were effectively treated with tobacco decoction on June 18.

On September 25 Woolly Aphis, *Schizoneura lanigera* (Hausm). having appeared upon a few twigs of apple, a decoction of tobacco stems was applied, and this not proving fully effective they were again sprayed, this time effectively, with kerosene emulsion.

The three sprayings, though apparently effective against scab, appeared to be less so as a preventive of codling moth, a large percentage of the fruit betraying the presence of the larvae—a result perhaps due to tardy or inefficient spraying, or perchance to the adulteration of the poison used.

No insect depredations have been observed, aside from those noted in connection with spraying.

There are at present two hundred and ninety-five varieties of apples on trial upon the station grounds, of which nineteen are either crabs or supposed hybrids and are tabulated separately. Of the remainder, one hundred and thirty-five have bloomed or fruited during the current year, while one hundred and forty-one have not yet shown bloom, and are not included in the tabulation.

In grading for quality, upon the scale 1 to 10. varieties are compared with those of the same species only.

TABULATION OF APPLES—*Pyrus*—1897.

Crabs—P—baccata; including actual and supposed hybrids.

Abbreviations—Month: b, beginning; e, end; m, middle. Form: c, conical; i, irregular; o, oblate; ob, oblong; ov, ovate; r, roundish. Color: g, green; r, red; ru, russett; s, striped; w, white; y, yellow. Texture: c, crisp; d, dry; f, firm; j, juicy; t, tender. Flavor: a, acid; m, mild; s, sweet. Use: c, cider; d, dessert; k, kitchen; m, market.

No.	Names.	Origin.	Planted.	Bloomed.	Ripe.	Season.	Weight, ounces.	Form.	Color.	Texture.	Flavor.	Quality Scale 1 to 10.	Use.
1	August	Minnesota	1890	May 12	Aug. 27	e Aug. b Sept.	3	r o	y r s	c f	a	3-4	k
2	Bechtel	Illinois	1894	June 5					fl pl				
3	Dartmouth	Massachusetts?	1890	May 12	e Aug.	e Aug b Sept.	2	o	r	c j	m	10	k d
4	Excelsior	Minnesota	1890	" 12	e Aug.	b Sept.	4	r o	y r	t j	m a	6	k m
5	Florence	Minnesota	1890	" 12	e Aug.	b Sept.	2	o	y r s	t j	a	6-7	k m
6	Gibb.	Wisconsin	1890	" 15	e Aug.	b Sept.	2	o c	y r	c j	m a	7-8	d k m
7	Gracie	Minnesota	1890										
8	Jelly	Minnesota	1890	May 13	e Sept.	b Oct.	2	o ob c	y r	c	a	5	k
9	Lou	Minnesota	1890	" 14	m. Sept.	e Sept.	6	r ov	y r s	t j	m	5-6	k
10	Martha	Minnesota	1890	" 17	b. Sept	Sept., Oct.	3	o	y r	c j	m	9-10	k m
11	North Star	Minnesota	1891	" 13	m. Aug.	Aug.	2	r o	y r	c	a	6	k
12	No. 1 New	Minnesota	1890										
13	No. 2 New	Minnesota	1890	May 12	e Aug	Sept.	5	o c	y g	c	m	6	k
14	October	Minnesota	1890	" 13	e Aug.	Sept.	6	r	r y s	c	a	5	k m
15	Peter	Minnesota	1890	" 19	b Sept.	Sept.	6	r o	r	f j	m	6-7	k m
16	Quaker		1891	" 14	m e Oct.	Oct., Jan.	2	r ov	y r	c	m s	6 7	k
17	Transcendent		1893	" 13	b Sept.	Sept.	3	r	y r	c	a	5-6	k m
18	Virginia		1894										
19	Whitney, 20	Illinois	1890	May 12	e Aug.	Sept.	4	ov c	r y	t j	m	8-9	d m

TABULATION OF APPLES - *Pyrus*—1897.—*Continued.*

P. Malus.

Abbreviations—Months: b, beginning; e, end; m, middle. Form: c, conical; i, irregular; o, oblate; ob, oblong; ov, ovate; r, roundish. Color: g, green; r, red; ru, russet; s, striped w, white; y, yellow. Texture: c, crisp; d, dry; f, firm, j, juicy; t, tender. Flavor: a, acid; m, mild; s, sweet. Use: c, cider; d, dessert; k, kitchen; m, market.

No.	Names.	Origin.	Planted.	Bloomed.	Ripe.	Season.	Weight in ounces.	Form.	Color.	Texture.	Flavor.	Quality—Scale 1 to 10.	Use.
1	American Blush	America	1890	May 19									
2	Arnold	Ontario	1890	" 19									
3	Babbitt	America ?	1890	" 15									
4	Bailey *Sweet*	New York ?	1888	" 15	Oct.	Nov.-Mar.	9	r	r	t	s	8-9	d k m
5	Batullen	Russia	1888	" 21									
6	Bietigheimer	Germany	1890	" 15									
7	Blue Anis	Russia	1890	" 17									
8	Borovinka	Russia	1888	" 13	e Aug.	Sept.	6	r o	y r s	c j t	a	5-6	k m
9	Bottle *Greening*	Vermont	1890	" 12	Oct.	Jan.-Feb.		o c	y r	t	m	5-6	d
10	Bough	America	1888	" 13	e Aug.	Sept.	6	r c	y	t j	s	6-7	d k
11	Bradford	Tennessee ?	1890	" 15	Oct.	Dec.-Mar.	5	r ov	g r s	t j	m	4	m
12	Buckingham	America ?	1892	" 19									
13	Canada *Baldwin*	Quebec	1890	" 18									
14	Carlough	America ?	1889	" 19									
15	Chenango	New York	1888	" 19	e Aug.	Sept.	6	ob c	y r s	t j	m	5-6	d m
16	Clark *Orange*	America ?	1892	" 19	b Oct.	Nov.	6	r o i	y r s	t c	m	5	
17	Cogswell	Connecticut	1888	" 13	Oct	Dec.-Mar.	8	r c o	y r s	t j	m	5	d m
18	Colton	Ohio ?	1888	" 12	m Aug.	Sept.	6	o v c	g y	t	m	6	d m
19	Colvert	America ?	1892	" 17									
20	Cornell	Pennsylvania	1890	" 19									
21	Crane	Illinois	1888	" 19									
22	Cullin	America ?	1890	" 19									
23	Day	Nebraska	1891	" 17	m Oct.	Nov.-Dec.	7	r c	y ru	t	m	3-4	m
24	Decarie	Quebec	1890	" 18									
25	Dickinson	America ?	1889	" 21									
26	Dyer	France ?	1888	" 14	m Sept.	Sept.-Oct.	7	r o	y r	t j	a m	7-8	d k
27	Early *Ripe*	Pennsylvania	1891	" 18									
28	Early Strawberry	New York	1888	" 18									
29	Egyptian	Kentucky ?	1888	" 19									
30	Evans	Idaho	1888	" 22									
31	Fall Pippin	America ?	1888	" 18									
32	Family *Favorite*	America ?	1891	" 18									

33	Fink	Ohio	1892	"	19									
34	Flory *Bellflower*	Ohio	1892	"	19									
35	Flushing	New York ?	1888	"	19									
36	Gano	Missouri ?	1890	"	17	m Oct.	Nov.-Mar.	11	o	y r	c t j	m	5	m
37	Garden Royal	Massachusetts	1888	"	19	m Sept.	Sept.-Oct.	4	r o c	g y r s	t j	m	10	d
38	Gavel	Nova Scotia	1895	"	19									
39	Gideon	Minnesota	1890	"	18	Sept.	Sept.-Dec.							
40	Gloege	Wisconsin	1888	"	12	Oct.	Dec.-Mar.	6	ob ov	y ru	c	m	4	m
41	Golden Reinette	Russia	1888	"	17	Oct.	Oct.-Nov.	5	o c	r y s	c	m	4-5	m
42	Golden Russett, *N. Y.*	England	1888	"	15	Nov.	Dec.-Apr.	6	r o	y ru	f j	m	7-8	d m
43	Grimes	Virginia	1890	"	18	Oct.	Dec.-Mar.	6	r ob	y	c t	m	8-9	d m
44	Grosh	Pennsylvania	1890	"	17	m Sept.	Sept.-Oct.	7	r o	g y r s	t j	a	7 8	k m
45	Haas *Fall Queen*	Missouri	1892	"	21									
46	Hagenkopt	Europe	1888	"	21									
47	Hargrove	America ?	1892	"	17									
48	Hawley	New York	1888	"	18	Sept. 15	Sept.	12	r o c	y	t j	m	5-6	d
49	Hubbardston	Massachusetts	1888	"	13	m Nov.	Nov.-Jan.	12	r ov	y r s	t j	m	7-8	d m
50	Indian ?	America	1892	"	22	m Sept.	Sept.-Oct.	9	r o	y r ru	t	m	4-5	m.
51	Indiana *Favorite*	Indiana	1892	"	19									
52	Iowa *Keeper*	Iowa ?	1891	"	19	Dec.	Dec.	5	o	g y r	f	m	4-5	m
53	Jacob	America ?	1890	"	18									
54	Jefferis	Pennsylvania	1888	"	15	m e Sept.	Sept.	8	r o c	y r s	t j	m	10	d
55	Jersey *Sweet*	New Jersey ?	1888	"	17	m Sept.	Sept.	6	r ov	r y	t j	s	5-6	d k
56	Jonathan	New York	1888	"	15	Oct.	Oct.-Feb.	6	r c	r y	t j	m	10	d k m
57	Keswick	England	1888	"	13	Sept.	Sept.-Oct.	7	c i	g y	t j	a	5	k m
58	Kinnaird	Tennessee	1892	"	14									
59	Kirkland	New York	1890	"	15									
60	Lady Sweet	New York	1890	"	24									
61	Lawver	Missouri ?	1890	"	18									
62	Limber Twig	N'th Carolina?	1892	"	19									
63	Longfield	Russia	1892	"	12	e Sept	Oct.-Feb.	9	r c	y r	j	m	5	k m
64	Looker	Missouri ?	1891	"	18									
65	Louise	Ontario	1890	"	18	Oct.	Oct.-Jan.							
66	Lowell	America ?	1890	"	15	m Sept.	Sept.-Jan.	10	r ob	y	t j	m	7-8	d m
67	Loy	America	1890	"	22									
68	Magog	Vermont	1890	"	18	Oct.		4	r ov	y r s	t	m	3-4	
69	Marmalade	Europe	1888	"	15	m Sept.		7	r o i	y r s		s	4 5	
70	Marshall	N. Hampshire	1892	"	14									
71	Mason *Orange*	Missouri ?	1890	"	18	Oct.	Oct.-Jan.	8	r o	y		m	5-6	
72	McIntosh	Ontario	1890	"	17	Oct.	Nov.-Feb.	6	r o	r y	t j	m	7-8	d m
73	Melon	New York	1888	"	24									
74	Minkler	Illinois ?	1892	"	17	Oct.	Jan.-Mar.	9	r c	g y r	f j	m	6-7	
75	Morris Red	America ?	1890	"	19									
76	Munson	Massachusetts?	1890	"	17	Sept.	Sept.-Feb.	4	o	y r	f j	s	4-5	k
77	Nero	America ?	1890	"	15									
78	Northfield	Vermont	1890	"	15	Sept.	Sept.-Dec.	7	r o	w y r s	c	a m	5	k m

TABULATION OF APPLES—*Pyrus*—1897.—*Concluded.*

P. Malus.

No.	Names.	Origin.	Planted.	Bloomed.	Ripe.	Season.	Weight in ounces.	Form.	Color.	Texture.	Flavor.	Quality—Scale 1 to 10.	Use.
79	Nyack	America?	1890	May 21									
80	Oakland	Michigan?	1888	" 13	Oct.	Nov.-Mar.	5	o	y r s	t j	m	7-8	d m
81	Oldenburg	Russia	1892	" 13	m Aug.	Sept.	8	o	y r s	c t j	a	4-5	k m
82	Ontario	Ontario	1890	" 17	Oct.	Jan.-April.	10	o	y r s	c j	m	6-7	d k m
83	Pawpaw	Michigan	1888	" 21									
84	Peck	Rhode Island ?	1888	" 18									
85	Pewaukee	Wisconsin	1892	" 19									
86	Picket	Kentucky	1888	" 18	Oct.	Dec.	6	r o c	y r s	t j	m	4-5	m
87	Pine Stump	Georgia ?	1892	" 15									
88	Primate	America	1888	" 13	m Aug.	Aug.-Sept.	7	r c	y r	t j	m	9	d k
89	Prolific *Sweet*	Connecticut	1890	" 18									
90	Pryor Red *Seedling*	Illinois ?	1888	" 18									
91	Pyrus Malus fl. pl.	America?	1892	" 12									
92	Quince *Cole*	America	1892	" 19	e Aug.	Sept.	6	r c	y	c t	a	4-5	k m
93	Rambo	Pennsylvania	1888	" 18									
94	Ramsdell *Sweet*	America	1890	" 15	Oct.	Oct.-Feb.	7	ob c	r	t	s	4-5	k m
95	Red Aport	Russia	1888	" 18	b m Sept.	Sept.-Oct.	10	o c	y r s	t j	m	5	k
96	Red Astrachan	Russia	1888	" 13	m Aug.	*	6	r o c	r y	t j	a	5-6	k m
97	Red Canada	New England ?	1888	" 19	Oct.	Jan.-May	6	o c	y r	f j	m	8-9	d m
98	Red Dettmer	Russia	1888	" 17									
99	Red June	Carolina?	1892	" 16	m Aug.	Aug.	3	ov c	r	t j	m	7-8	d
100	Red McMahon	America	1894	" 16	Aug.								
101	Red Russet	N. Hampshire	1890	" 19									
102	Rhode Island	Rhode Island ?	1888	" 15	Oct.	Dec.-Mar.							
103	Ribston	England	1888	" 19									
104	Ronk	Indiana	1888	" 18									
105	Rosenhager	Europe	1888	" 13	Oct.	Oct.-Dec.	9	r o c	g y r s	f	a	5-6	k m
106	Roxbury	Massachusetts	1888	" 13	Oct.	Jan. June	6	r o	y ru	f j	m	7-8	k m
107	Salome	Illinois	1898	" 19									
108	Scarlet Cranberry	America	1891	" 18									
109	Scott *Winter*	Vermont ?	1892	" 18									
110	Sheriff	Pennsylvania	1891	" 17	Oct.	Oct.-March	6	r ob c	g r s	t	m	7	m
111	Smokehouse	Pennsylvania	1893	" 18									
112	Somerset *New York*	New York	1892	" 18	e Aug.	Sept.	6	c	y ru	f j	a	8	d k
113	Spencer	America	1891										

114	Stark	Ohio?	1888	May	17	Oct.	Dec.-Apl.	8	r ob c	g y r s	f c	m	4-5	m
115	St. Lawrence	America?	1888	"	19	e Sept.	Oct.	9	o c	y r s	f j	m	5-6	d m
116	Stewart?	America?	1890	"	18									
117	Stump	New York	1889	"	14									
118	Summer Livland	Russia	1890	"	19	m Sept.								
119	Summer Pearmain	America?	1888	"	18	b m Sept.	Sept.	5	o c	r ru	t j	m	10	d
120	Summer Rose	America?	1892	"	17	m e Aug.	Aug.	3	o	y r s	t j	m	8	d
121	Thaler?	Russia	1888	"	15	b Sept.	Sept.	4	o b	y r s		m	5	k
122	Thornton	America?	1892	"	18	Oct.	Nov.	6	r ov	g y r ru	f j	m	6	m
123	Titovka	Russia	1888	"	13	m Aug.	Sept.	8	o c i	y r s	c j	m	5-6	k m
124	Tolman	Rhode Island	1888	"	17	Oct.	Dec.-Mar.	6	r o	y r	f	s	8	k m
125	Townsend	Pennsylvania	1890	"	21									
126	Wagener	New York	1893	"	13	Oct.	Dec.-Mar.							
127	Washington *Str.*	New York	1890	"	13	b Sept.	Sept.	7	o c	y r s	t j	m a	7-8	d c
128	Water	Pennsylvania	1890	"	17	Oct.	Oct.-Nov.	5	r ov c	y r	t j	m	5	d m
129	Wealthy	Minnesota	1890	"	18	m Sept.	Oct.	8	r o	y r	t j	m	6	d m
130	Whinnery	America	1890	"	12									
131	Winter Streifling	Russia	1888	"	16	m e Sept.	Sept.-Oct.	8	r o	y r s *	t j	m	4-5	k m
132	Yellow Transparent	Russia	1888	"	18	m Aug.	Aug.	5	ov c	y	c j	a	3-4	k m
133	York Imperial	Pennsylvania	1892	"	19									
134	Zolotoreff	Russia	1890	"	17	e Aug.	Sept.	10	r	y r s	f c	a	3-4	k m
135	Zozoff	Russia	1890	"	13	m Sept.	"		r c	y r	t c	a	3-4	k m

* m Aug.-m Sept.

CRABS.

August, Excelsior, Florence, Gideon, Gracie, Jelly, Lou, Martha, No. 1 New, No. 2 New, and October, are all seedlings originated by Peter M. Gideon, of Minnesota, and are, by him, claimed to afford a succession of varieties adapted to the climate of that far northern region. The Cherry crab is claimed to be the parent from which these, together with the Wealthy, have been evolved; although several of them—the last especially—afford, in fruit or tree, more or less decided indication of *malus* parentage.

Bechtel is said to be of *angustifolia* parentage. Its blossoms are large and very beautiful, and as double as miniature roses.

Dartmouth is one of the largest and most beautiful of its class; with the dark, rich, glossy color of the older Hyslop.

Northfield, though tabulated in our *malus* class, is placed among crabs (doubtless correctly) by Downing.

Quaker is a late ripening variety of fair quality. The name was apparently bestowed as expressive of the peculiar, light color of the young wood of the tree, as well as the fruit, which is nearly or quite sweet, and a comparatively long keeper.

APPLES.—*P. Malus.*

A considerable number of the varieties tabulated as fruiting for the first time this season, have so failed to mature good specimens that notices and characterizations are deferred to await the more full and perfect development of their true character.

Borovinka and Oldenburg, as grown here, although distinct, resemble each other so closely in tree, fruit, season and productiveness, that a difference will scarcely be observed by the average fruitgrower.

Gano is understood to have originated in the southwest. Its fine size and showy appearance may render it profitable for market, to which it appears to be mainly adapted.

Garden Royal is by no means new, though but sparsely disseminated. Its rather small size of both tree and fruit specially adapt it to garden planting; while its evenness of size, rich color, and mild, rich flavor, render it an admirable dessert apple.

Golden Reinette, Longfield, Marmalade, Red Aport, Red Dettmer, Rosenhager, Thaler, Titovka, Winter Streifling, Zolotoreff and Zuzoff are from the Russian importations of Prof. Budd and others, although the names of several of them indicate a German origin. Thaler is probably not true to name. The trees are nearly all free growers and most of them early and profuse bearers. In this climate all ripen in early autumn and are only adapted to culinary uses.

Grimes (originally Grimes' Golden Pippin) is one of the few apples, originating in Virginia, which seems to maintain its good qualities when grown as far north as Michigan, although, so far, it lacks productiveness here.

Hawley is large, beautiful and excellent; but deteriorates rapidly after maturity.

Hubbardston is large, beautiful and excellent, whether for home or market purposes; from November to midwinter.

Indian is a fickle title, which seems to apply equally to several varieties. The one fruited here comes from Missouri, and is a medium sized September apple of scarcely medium quality.

Jefferis has no superior as a beautiful and excellent dessert apple for September.

Jersey Sweet, as a dessert and culinary sweet apple, has few if any superiors during its season.

Jonathan, as an early and midwinter apple is too widely and favorably known to require description. Here, as elsewhere, to give thorough satisfaction, it should have rich soil and good culture.

Louise, *Princess Louise*, is a comparatively recent Ontario seedling, with many characteristics of the Fameuse family of apples. Promising for both dessert and market.

Lowell is an early and profuse bearer—a fair market variety for September.

McIntosh is another apple of the Fameuse type, of Canadian origin; apparently possessing desirable qualities for both dessert and market, especially at the North.

Minkler is perhaps an old variety, unidentified and renamed. It is more popular farther west.

Munson is a desirable and very beautiful sweet apple; well worth a place, where a sweet apple of that season is desired.

Oakland, *Oakland County Seeknofurther*, is a popular variety in Oakland County, Mich., and quite possibly may be an unrecognized and renamed old apple. Here the tree is an unusually slender, spreading grower, and an early bearer. Fruit beautifully blushed, with a mild, rich flavor.

Ontario, originating in the province of that name, is said to be the result of a cross, between Northern Spy and Wagener, by the late Charles Arnold. The tree proves to be an early and profuse bearer, and the large, fine, fruit keeps well till spring.

Primate has no superior as an August dessert apple; with the drawback, however, that overgrown specimens are likely to become watercored. Its delicate texture, together with its habit of ripening in succession, to some extent, unfit it for the market.

Quince (of Cole) is an old, very highly flavored apple, especially fine for culinary purposes.

Ramsdell *Sweet*, *English Sweet*, of Downing, is excellent as a late autumn and early winter sweet apple.

Red Astrachan is so well and widely known as scarcely to require mention. For market, it somewhat lacks productiveness.

Red Canada, so long the most popular market winter apple in Detroit and Chicago markets, under the pseudonym—Steel's Red Winter, is no longer successful in the eastern Michigan region where it was once so extensively grown, largely, no doubt, owing to the increased depredations of insects and fungi, and perhaps even more largely to the depletion of soils from continual cropping, without adequate fertilizing. The variety is said to be inclined to scab and crack on some light soils; still it may reasonably be hoped that careful, thorough fertilizing and spraying may largely overcome these difficulties, and, possibly, to some extent, restore its lost prestige. The variety is now fruiting at this station, and even on very light soil, is showing perfect fruit.

Red June is highly valued as an early apple of fine flavor and great beauty. In Michigan it is inclined to scab, crack and overbear.

Roxbury is not quite hardy in Michigan. The tree is of low, spreading habit. The fruit, if kept in close packages to prevent shriveling, is one of the best long keepers.

Sheriff originated in Pennsylvania. Though not of high quality, it is valued farther west, on account of the hardiness of the tree.

Somerset, N. Y., is an early apple of high, sprightly flavor. The tree is an unusually early bearer.

Stark is valued for market, on account of the hardiness, vigor and productiveness of the tree. It is a long keeper, though quite low in quality.

St. Lawrence, ripens at a season when there is an excess of fruits, on which account its real merits are, to some extent, overlooked. It is attractive and valuable, both in tree and fruit.

Summer Pearmain, but for the tendency of the fruit to scab and crack, and that it ripens in the height of the peach, plum and grape season, might well be placed at the head of the list of dessert apples, so far as both beauty and quality are concerned.

Summer Rose, although not the equal of the foregoing in either size or quality, is yet of satisfactory size and quality, and even more beautiful.

Thornton, if at all valuable, is so on account of the vigor and productiveness of the tree. The fruit, though of fine size, is unattractive in appearance and low in quality.

Tolman, *Talman Sweet*, though a very popular long keeper, is objectionably firm and tough in texture, and also lacks juiciness.

Washington *Strawberry*, though ripening in early September, and less desirable for that reason, is large, beautiful, and an early bearer. A good culinary apple.

Water, is an early, profuse bearer, and the tree of good habit, but the variety has many rivals, with equal and even superior merit, at least for this locality.

Wealthy, originated by Peter M. Gideon, of Minnesota, as alleged, from seed of Cherry crab, but its obvious freedom from all indication of crab parentage, begets the suspicion that, by mixture of seed or otherwise, an error may have occurred. Though a winter variety and fairly hardy at the extreme north, it ripens in October in Southern Michigan, where it is only a medium dessert and market fruit.

QUINCES—*Cydonia*.

TABULATION OF QUINCES—*Cydonia*—1897.

Name.	Planted.	Bloomed.	Ripe.
Alaska	1891	May 22	Middle of October.
Angers	1890		
Bourgeat	1895		
Champion	1888	May 31	End of October.
Fuller	1891	May 29	
Hong Kong	1888		
Meech	1888	May 31	Middle of October.
Missouri	1890	May 22	Middle of October.
Orange	1888	May 22	Beginning of October.
Rea	1888	May 22	Beginning of October.
Van Deman	1895		

Quinces were included in the spraying to which the entire plantation was treated, while yet dormant.

July 1st they were sprayed with Bordeaux in connection with the plums with which they are alternated.

Neither insects nor fungi have been observed attacking either plants or fruit of the quince during the season.

Angers, Bourgeat, and Van Deman, have not yet fruited here.

Hong Kong was planted here as early as 1888. It has proved hardy, and has made moderate annual growth, but has neither bloomed nor fruited.

Champion cannot be depended upon to fully ripen, even in average seasons in Southern Michigan.

NUTS, 1897.

ALMONDS.—*Amygdalus communis.*

Luelling, a hard shelled variety, planted in 1892, is hardy and vigorous in this climate. It bloomed on April 29 and ripened the last of October to the first of November. The fruit, though of fine size, proved nearly neutral in flavor. Much of the foliage dropped before the fruit matured.

Soft Shell, planted in 1892, has also proved hardy here. It bloomed for the first time on April 29 last and ripened a light crop of nuts, which were gathered about the middle of October. Although pleasant in flavor they scarcely equaled those offered for sale commercially. This variety also dropped a portion of its foliage prematurely.

CHESTNUTS.—*Castanea.*

The soil of the location in which chestnuts were planted is apparently not suited to their needs, owing perhaps to retentive clay subsoil a foot or two beneath the surface. Apparently from this cause several varieties have failed, after a year or two of growth.

Of those remaining, Comfort, Hathaway and Japan Giant, have not yet fruited.

Numbo partially matured several burs last autumn from buds which should have remained dormant till spring. As a result it has made little growth and shown no fruit the past season.

Paragon produced a fine crop of nuts the past season, setting far more than it could mature.

Spanish (a seedling of the European type) has also fruited abundantly, although the nuts are rather small for that species and of low quality.

FILBERTS AND HAZELNUTS.—*Corylus.*

Cosford, *Thin Shell* filbert, is yet growing satisfactorily, but has not yet fruited.

Hazelnut plants, received from the national division of pomology in 1892, though healthy and vigorous, have not yet either bloomed or fruited.

Kentish Cob filbert, planted in 1892, is again showing an abundance of catkins, but so far has failed to fruit, though growing satisfactorily, and not noticeably injured by the cold of winter.

PECANS.—*Hickoria* (*Carya*) *olivaeformis.*

Trees of this, grown from Iowa seed, prove hardy here, having stood unprotected, without injury, since the nuts were planted in 1890.

Seedlings of Stuart pecan, grown from Texas seed, planted in 1894, although mounded with earth each winter, have yearly been killed nearly to the collar, till in the autumn of 1896, when they were trussed with straw, and earthed up still more deeply, and came out the next spring, nearly or quite uninjured. They were planted in orchard, and are now thoroughly trussed with straw, and mounded with earth.

WALNUTS—*Juglans*.

Japan Walnut—*Juglans Seiboldii*, in both tree and fruit, somewhat resembles our native butternut, though the tree is even more vigorous, with large and more glossy foliage, and the smaller and less roughened nuts are produced in greater abundance.

Persian, English or European Walnut, known also as Madeira nut, *Juglans regia*, though apparently hardy here, makes but moderate annual growths, and, though planted in 1890, does not yet afford indications of fruiting.

Praepaturiens, a dwarf variety of the foregoing, planted in 1890, has not yet fruited.

Thin Shell, planted in 1894, is also, apparently, a variety of this species.

APRICOTS—*Armeniaca vulgaris.*

Harris, a variety originating in Central New York, and said to be productive and profitable there, is the only variety now on trial here. It has not yet fruited.

The Russian varieties, for a time highly commended farther west, were on trial here for several years, without satisfactory results. They have been dropped from our lists.

MULBERRIES—*Morus.*

Downing is scarcely hardy enough, even in our Lake Shore climate.

Hicks is a Southern variety and quite popular there, but it fails to maintain its qualities in our Michigan climate.

New American is hardy and very productive. Its fruit ripens in succession, during a period of six or eight weeks, and is of fine size and very pleasant flavor.

NECTARINES—*Persica vulgaris.*

Pitmaston bloomed the past year, for the first time, on May 4th, and set a light crop of fruit, which, however, was ruined by the curculio, not a specimen escaping.

Kentucky, understood to be a recent seedling from that state, comes to us, in bud, from the National Division of Pomology. The buds were inserted, in 1896, in a tree of bearing age, and may, perchance, fruit the coming year.

ASPARAGUS—*Asparagus officinalis.*

Palmetto may still be regarded as the preferable one among the older varieties.

Columbian, *Mammoth White*, which has been planted more recently, is even superior to the former in some respects.

Owing to its diœcious character, it would seem doubtful if the peculiar characteristics of a variety can be maintained in the process of reproduction from seed, otherwise than by the isolation of the seed-bearing parent, and farther, by the selection of the young plants, with careful reference to the desired type.

RHUBARB—*Rheum rhaponticum.*

The plantation of rhubarb having become crowded and deteriorated, on account of long standing in the same ground, the plants have now been removed and a new plantation made.

Linnæus, has pretty well demonstrated its superiority as compared with the varieties with which it has been tested, although its superiority as compared with several others is but slight.

Bailey, received from S. S. Bailey, of Kent county, Michigan, is the only variety replanted for farther trial.

T. T. LYON.

South Haven, Mich., January 15, 1898.

VEGETABLE TESTS OF 1897.

BY L. R. TAFT, H. P. GLADDEN AND M. L. DEAN.

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As in previous years we grew most of the new varieties sent out by the seedsmen, as well as many of the standard sorts, and kept careful notes upon their behavior. We also undertook quite a line of experiments in methods of culture and the use of various fertilizers, particularly with potatoes and celery, but the excessive rains during August so affected the results as to make it impossible to draw correct conclusions.

BUSH BEANS.

Variety.	Seedsman.	Date edible.	Number of pods on one plant.	Weight of pods on one plant. Ounces.	Average weight of single pod.
Black Valentine	Henderson	July 26	71	11½	.162
Cream Valentine	"	" 29	109	20½	.187
First in Market	Landreth	" 26	90	10	.111
Fuller Black Wax	Gregory	" 28	108	18½	.171
Improved Goddard	Ferry	Aug. 7	61	11	.180
Lima Wax	Dreer	" 9	97	9	.093
Refugee	Livingston	" 7	63	9	.143
Stringless Green Pod	Burpee	" 2	121	20½	.169
Union White Valentine	Johnson & Stokes	" 21	16	2½	.156
Vineless Marrow	Ferry	" 16	43	7½	.174
Warren	Gregory	" 7	58	6½	.112
Yosemite Wax	Johnson & Stokes	" 2	110	17	.155
Byer's One Bean	Byer Bros.	" 11	271	47	.169

NOTES ON VARIETIES.

The following sorts have not been heretofore described in our bulletins:

Black Valentine.—The plants are of moderate growth and quite badly affected with rust. The pods are longer than the common Red Valentine and not curved; light green in color, tender and the quality is of the best. Scarcely so productive as some other sorts of the same season.

Cream Valentine.—Plants of vigorous, healthy growth. Pods longer, darker green, more curved, round and remain much longer in edible condition than Black Valentine, though the quality is not so good. Productive. A good, early, green-podded sort.

First in Market.—Plants of rather small growth and rusted badly. Pods long, green, curved and flattened. The variety is very slow to form beans in the pods and so it has a long edible season. It is early, but scarcely so productive as the Valentine class.

Improved Goddard.—This is an excellent sort to use as a green-shelled bean, as the beans are large, handsome in appearance and of fine quality.

Union White Valentine.—This variety has been grown for two seasons and has been very unproductive.

Vineless Marrow.—This is a field sort that is strong and healthy in plant growth and quite free from runners. The beans are extra large and fine in quality. A most excellent baking sort.

Byer's One Bean.—Plants of healthy, vigorous growth, very branching and productive. The pods are 5–6 inches long, round, nearly straight, green in color, very brittle and fine in quality. The plants are very productive and have a long season of bearing.

It is a valuable sort for the home garden or market.

Of the older sorts that have been grown for several seasons, some of which are omitted from the above table, *Cylinder Black Wax*, *Flageolet Victoria* and *Saddle-back Wax*, among the yellow-podded sorts, and *Red Valentine* and *Stringless Green Pod* among the green-podded, are worthy of mention as sorts of high excellence.

SUMMARY OF VARIETIES.

The following wax sorts have given the best satisfaction here:

Cylinder Black Wax, *Flageolet Victoria*, and *Golden Wax*.

Among the better green-podded varieties are: *Red Valentine*, *Cream Valentine*, *Stringless Green Pod*, and *Byer's One Bean*.

Improved Goddard as a shell bean would give good satisfaction.

POLE BEANS.

The cold, wet weather of June was very injurious to the seed of the pole varieties of beans planted, and it was almost impossible to get a good stand of plants. The frost of September 20 killed several sorts before they had matured edible pods or beans. For these reasons we have not attempted to tabulate the varieties grown the past season.

The following sorts matured sufficiently for partial notes to be taken:

Golden Lima.—Plants do not grow very high, but make a bushy growth at the bottom where a large crop of pods is borne. Very few pods had beans of edible size at time of frost. The beans were green in color and had not yet attained the rich golden claimed for them.

Mammoth Podded Horticultural.—Plants are of low, bushy growth. Pods dark green, streaked with carmine. But few pods had edible beans at time of frost.

Mastiff.—Plants of very strong growth and very productive. Pods straight, 6–8 inches long, broad, golden yellow in color, fleshy, and excellent in quality. This variety matured a fair proportion of pods before frost. It is an excellent wax pole bean.

Powell's Prolific.—Plants are very vigorous, growing to the top of the poles 8 to 9 feet high, and very prolific with pods from bottom to top of vines. Pods 5 to 6 inches long, round, regular in form and light green in color. The pods are very handsome in appearance with solid flesh of the finest quality. The variety was edible September 7, and remained in condition a long time. Valuable for earliness, productiveness, fine quality, and handsome appearance.

Seibert's Early Lima.—Plants strong, growing to tops of poles and productive. Pods are large, broad and contain 3 to 4 large beans that are excellent in quality. Edible September 16. One of the earliest and most valuable of the pole limas.

BUSH LIMAS.

Henderson's was the only one of the bush limas to mature edible beans before the plants were killed by frost.

CUCUMBERS.

The cucumbers were planted June 9. The following table gives the relative productiveness, time of maturing, and size of the varieties planted:

Variety.	Seedsman.	Productiveness.	Date of pickling size.	Date of slicing size.	Average weight of single fruit. Ounces.
Arlington White Spine	Vaughan	90	Aug. 5	Aug. 9	7
Astro	Leonard	40	" 6	" 11	9.5
Beauty	Childs	85	" 2	" 7	7.5
Choice	Landreth	88	July 29	" 3	8.5
Emerald	Livingston	75	Aug. 5	" 10	9.5
Fordhook	Burpee	90	" 6	" 11	9.75
Goliath	Vaughan	80	" 4	" 9	17
Green Prolific	Ferry	92	" 2	" 7	7.5
Hill's Forcing	Vaughan	90	" 7	" 12	11
Japanese Climbing	Maule	92	" 11	" 15	18
None Such	Salzer	83	" 5	" 10	11.5
Sixty Day	"	94	" 4	" 9	12
Westerfield Pickling	Ferry	95	July 25	July 31	9.5

NOTES ON VARIETIES.

White Spine (Arlington).—This type is the general favorite among growers and market men and is the sort most largely grown for table use.

Astro.—Plants of small growth and few fruits borne. Leaf stalk short and leaves thicker in texture than those of most sorts. Fruits 6–8 inches long, 2 inches in diameter, round with few very short black spines; color a dark green. Excellent in flavor, but not firm or crisp. Unproductive and undesirable among the better sorts.

Beauty.—Plants of good growth. Margins of leaves quite deeply cut and spiny. Fruits 4-5 inches long, 2-2½ inches in diameter and triangular. The color is dark green and the spines are few, short and white. The form of the fruits is too short and thick for early pickles or for slicing.

Choice.—Plants are of vigorous, healthy growth. Fruits 5-6 inches long, 1½ inches in diameter, somewhat curved, light green, nearly white in color, with short, stout, black spines. The variety is early and the fruits are good form for pickling or slicing purposes. An excellent general sort.

Emerald, *Fordhook*, *Green Prolific* and *Hill's Forcing* are excellent sorts for pickling and for table use. Emerald remains a long time in condition before ripening.

Goliath.—A large fruiting sort, excellent for home use, but too large and irregular in form to sell well in market.

Japanese Climbing.—This variety has been grown for several seasons. While the vines have a tendency to climb, they do well grown in the ordinary way. It is not so early as some others, but the fruits are of good form, attractive in appearance, fine in quality, and the plants are productive. A most excellent sort for pickling or for table use.

None Such and *Sixty Day* are closely of *White Spine* type and are good sorts, but the *White Spine* is preferable because a standard variety.

Westerfield Pickling.—Plants of very strong growth, healthy and productive. Early. A most excellent pickling sort, also a good table variety if left to get of proper size.

SUMMARY OF VARIETIES.

For early pickles: *Russian.*

For early slicing and pickling: *Choice* and *Westerfield Pickling.*

As general sorts for table and market: *White Spine* and *Japanese Climbing.*

LETTUCE.

Grand Rapids, of the loose growing sorts, has given the best results in the forcing house and hot beds. This variety gives a greater weight of crop from a given space and is less susceptible to rot than any other of the several kinds tried.

Where there is a demand for a close heading variety, *Tennis Ball*, *Boston*, and *Rawson's Hot-House* are excellent sorts to grow. The heading varieties must bring a higher price per pound than the loose sorts to make their growing profitable.

Seed for the varieties grown out doors was sown in the forcing-house March 24th, and the plants were removed to open ground May 13th. The table below gives the data obtained from this planting.

Variety.	Seedsman.	Date of maturity.	Average weight of a single head.
All Seasons	Dreer	July 6	12 oz.
Asparagus	"	June 28	13 oz.
Belmont	"	" 24	4 oz.
Big Boston	"	" 27	9 oz.
Brown Dutch	Ferry	July 2	11 oz.
Brown and Gold	Vaughan	" 5	9½ oz.
Cos	Burpee	" 3	1 lb 10 oz.
Defiance	Vaughan	" 2	9 oz.
Denver Market	Ferry	" 2	14 oz.
Half Century	Childs	" 2	15 oz.
Imperial	Vick	June 25	12 oz.
Italian Ice	Burpee	July 2	15 oz.
Landreth Earliest	Landreth	" 2	1 lb. 2 oz.
Mammoth Cabbage Head	Vaughan	June 29	1 lb. 3 oz.
Market Gardener's Detroit Forcing	Ferry	July 6	13 oz.
Mignonette	Henderson	" 1	4½ oz.
Morse	Burpee	June 30	1 lb. 2 oz.
Ninety and Nine	Vaughan	" 24	4 oz.
Premium Cabbage	Vick	" 30	8½ oz.
Rawson's Hot House	Vaughan	" 21	4 oz.
Sensation	Johnson and Stokes	" 30	3 oz.
Simpson's Curled	Ferry	July 5	1 lb. 5 oz.
Sumatra	Landreth	" 2	13½ oz.
Treasure	Johnson and Stokes	" 5	13 oz.
Wonderful	Dreer	" 2	1 lb. 8 oz.

NOTES ON VARIETIES.

Asparagus.—A *Cos* variety growing from 14–18 inches high. The leaves are very narrow. It makes too little growth in the center to be a desirable sort for tying up and blanching.

All Seasons.—Forms a rather close head from 12 to 15 inches in diameter. The outer leaves are large, round and smooth in general outline and of a dark green color. The inner leaves are of a rich, golden yellow color, tender and of good quality. The variety is well adapted to out door culture, as it stands heat well and is slow in forming a seed-stalk.

Belmont, *Boston*, *Denver Market*, *Rawson's Hot House* and *Sensation* are desirable sorts for the forcing-house or hot-bed, but give little satisfaction grown as out door varieties.

Brown Dutch.—Forms a close, compact head from 8 to 10 inches in diameter. The inner leaves are of a light yellowish green, tender and of very fine quality. An excellent dark-colored sort and it stands heat well.

Brown and Gold.—This sort resembles the preceding, but the leaves are more crinkled, the heads smaller and have fewer outer loose leaves. It is a little later than *Brown Dutch* and scarcely as good a variety.

Defiance.—This variety forms a close head which is tender but not of very good quality. The heads are too small and the sort is not so desirable as some of the larger growing kinds.

Half Century and *Treasure.*—These two sorts are very similar in appearance, though the heads of the *Half Century* are a little larger in size and more uniformly developed. The type is closely like *Brown Dutch* in leaf and habit of growth, but the leaves are lighter green in color and the heads closer and more compact. They are excellent sorts.

Imperial. This was the first of the large growing sorts to mature heads. Heads 10 to 12 inches in diameter, light green in color, very tender and the quality is good. Valuable for earliness and good quality.

Italian Ice.—Forms a loose but not open head. It is a large growing sort and the tenderness and fine quality of the inner leaves is very marked. It sends up a seed-stalk very quickly. A fine sort for garden growing.

Landreth Earliest.—It forms a loose, open head that can be cut for use as soon as it has reached sufficient size. If allowed to mature, the heads are large and of fine texture and quality. A valuable large-growing sort. It is also a good variety to grow in the frames or forcing-house.

Mammoth Cabbage Head.—A large-growing sort forming a rather loose head. The leaves are quite smooth and regular in outline and the head is, perhaps, not so attractive in appearance as some of the more crinkled sorts. It is very tender and of fine quality. The variety soon goes to seed.

Ninety and Nine.—A lettuce of the *Tennis Ball* type but a poorer grower. A good forcing sort, but of little value out doors.

Simpson's Curled.—An old sort but one of the best grown. It is a little later in season than some others, but the large heads, fine appearance and good quality of this variety make it well worthy of a place in every garden.

Sumatra Curled.—Appears to be identical with *Denver Market.*

Premium Cabbage.—A variety of the *Tennis Ball* type but a somewhat larger grower and a little later in maturing.

Wonderful.—Forms a very large head, 15 to 17 inches in diameter and quite firm. The outer leaves are large, dark green, much waved and crinkled. The inner leaves are of a rich, golden yellow color, very tender and of fine quality. It remains a long time in condition before sending up a seed-stalk. A very fine variety.

SUMMARY OF VARIETIES.

For forcing purposes, *Grand Rapids* of the loose-growing and *Tennis Ball* or *Rawson's Hot House* of the cabbage-heading sorts, have given the most satisfactory results.

All Seasons, *Half Century*, *Landreth Earliest*, *Italian Ice*, *Simpson's Curled* and *Wonderful* are recommended for out-door growing.

PEPPERS.

Peppers are not commonly grown in the kitchen garden, possibly because their uses are not better known or their culture considered difficult. The seed should be sown in boxes in the house, or, preferably, in a frame outdoors, from the middle to the last of March. The plants should not be set out until all danger from frost is over. The varieties are quite different in size, form and number of fruits produced and in the time of ripening.

The following notes may aid the grower in selecting the varieties best suited to their needs:

Cardinal.—The fruits are 6 to 8 inches long, 1 inch in diameter at base and tapering. The variety is of early maturity and a rich, dark red color, but the fruits are so curved and twisted as to be unattractive in appearance.

Cayenne Red.—Somewhat similar to preceding, but fruits are smaller and shorter and a lighter red in color. The plants are very productive and the fruits very sharp in flavor.

Cherry.—This variety bears fruits that are round and about one inch in diameter. The plants are ornamental but the fruits are of little value.

Coral Gem Bouquet.--The fruits are one inch long and ½ inch in diameter. The plants have finely cut foliage and are thickly set with the small fruits making a very ornamental plant. This is the sort usually grown for small peppers. It is early and usually matures the fruits before frost comes.

Elephant's Trunk.--This variety bears long, large, irregular fruits that usually do not ripen before frost.

Golden Dawn.--The plants are productive and the fruits regular in form, large and of a rich golden yellow color. A desirable yellow sort.

Kaleidoscope.--The fruits are small, ridged and of little value. As an ornamental plant, because of the constantly changing colors of the fruits borne, it has a place.

Large Bell.--This is the sort usually grown for commercial purposes. The fruits are 3 to 4 inches long and 2 to 3 inches in diameter, quite smooth and regular in form and mild in flavor. The best sort for general cultivation.

Ruby King.--The fruits are much larger in size than the *Large Bell*, but not so many are borne and the variety is later in ripening.

TOMATOES.

The seed was sown in the forcing-house, March 19. The seedlings were transplanted April 4, and the plants set out in the field June 4. The plants made a good growth early in the season but did not bear one-half the usual crop of fruit. While this failure in crop may be due, in part, to the frequent rains occurring when the fruits were setting, the greater loss was caused by the fungus *Septoria Lycopersici*. This disease attacks the leaves and stems, causing the foliage to dry up and drop off, thus stopping further development of the fruit. The disease is new to this country and promises to be very destructive to the tomato crop. Some varieties seem to be more susceptible to attacks of the fungus than are others. It is probable that Bordeaux mixture will be found a remedy. The damaging nature of the disease was not known until late in the season and, although Bordeaux was then applied, it did little to prevent the loss in crop. Next season, earlier and more thorough treatment will be undertaken to control the disease.

In the table below will be found the date of first fruit ripening; the number and weight of fruits produced on one plant to September 3, and in the next column the total crop of ripe fruit borne on the same plant during the season. The average weight of a single ripe fruit is given, also the amount of green fruit on the plant when it was killed by frost (September 21). By dividing the crop into the two periods, the earliness of the varieties is more readily determined and a better index of value given than if the total crop produced was reported in one column.

The (*c*) following the seedsman's name in the table indicates that the variety has been grown one year at the College and seed saved from that planting for the present test.

TOMATOES.

Variety.	Seedsman.	Date of first ripening	Fruit ripe Sept. 3.			Fruit ripe Sept. 20.			Average weight of a single ripe fruit.—Ounces.	Weight of green fruit on plant at time of frost.	
			No.	Wt.		No.	Wt.				
				lbs.	oz.		lbs.	oz.		lbs.	oz.
Acme	Vaughan (c)	Aug. 8	14	5	6	28	11	2	6.35	9	3
Advance	College	“ 11	75	13	3	177	26	1	2.46	11	14
Alexander	Moore (c)	“ 19	19	3	12	74	16	10	3.59	12	8
Atlantic	Buckbee(c)	“ 10	82	20	15	100	25	7	4.47	4	--
B. B.	Johnson & Stokes(c)	“ 23	1	--	7	25	10	8	6.72	30	11
Beauty	Vaughan (c)	“ 15	77	21	0	128	37	5	4.19	8	12
Brandywine	College	“ 19							5.90		
Bright and Early	Dreer(c)	“ 21	19	2	10	122	19	5	2.53	18	7
Buckeye State	Livingston	“ 29							7.25		
Chemin	Thorburn(c)	“ 26							4.58		
Conqueror	“ (c)	“ 10							3.50		
Crimson Cushion	Henderson (c)	“ 23							7.62		
Criterion	Vick(c)	“ 21							3.00		
Cross Bred	Landreth(c)	“ 29							5.90		
Cross No. 3	Va. Agr'l College(c)	“ 16							7.70		
Daybreak	Dreer(c)	Sept. 2	1	--	4	10	2	15	4.70	15	12
Democrat	Thorburn(c)	Aug. 26	3	1	6	10	4	9	7.30	12	--
Diadem	Childs	“ 23	1	--	6	17	6	6	6.00	16	14
Dwarf Aristocrat	Buckbee(c)	“ 17	5	1	11	20	5	8	4.40	7	8
Dwarf Champion	Vaughan (c)	“ 19	5	--	15	14	2	15	3.35	4	8
Earliest (Select Early)	College	“ 7	103	14	2	138	18	1	2.09	1	3
Earliest (Round)	“	“ 9	58	11	10	108	21	15	3.25	5	--
Earliest (Oblong)	“	“ 7	48	8	15	74	13	4	2.88	5	1
Favorite	Vaughan (c)	“ 20	4	1	14	14	6	10	7.57	13	--
Ferris Wheel	College	“ 26							7.25		
Fiji		“ 23	14	4	1	30	8	12	7.66	5	--
Fordhook	Vaughan(c)	“ 26	8	2	3	16	5	--	5.00	15	--
Fortune	Johnson & Stokes(c)	“ 19	13	4	14	41	16	7	6.16	15	14
Golden Jubilee	Childs(c)	“ 20							9.00		
Golden Queen	Vaughan(c)	“ 20	1	--	5	14	4	2	4.71	26	10
Honor Bright	Livingston	“ 29	43	10	12	51	12	7	3.90	15	12
Hybrid No. 1	Landreth	“ 17							4.42		
Hybrid No. 4	“	“ 22							4.85		
Hybrid No. 22	“	“ 27							3.66		
Hybrid No. 25	“	“ 23							3.00		
Hybrid No. 50	“	“ 19							4.25		
Ignotum	College	“ 21	6	3	5	19	7	3	6.05		
Imperial	Maule(c)	“ 19	13	4	8	31	10	11	5.51	13	6
Ivory Ball	Landreth (c)	“ 21							1.28		
Jersey	“	“ 23	8	1	8	50	11	2	3.56	20	--
La Crosse	College	“ 16	17	4	7	32	8	9	4.28	6	9
Large Red	“	“ 19							4.80		
Leader	Vick	“ 9	68	14	13	110	23	9	3.43	5	11
Lemon Blush	Thorburn (c)	“ 23							5.83		
Lemon Yellow	Livingston	“ 23	5	1	6	25	5	5	3.40	6	--
Lorillard	Dreer	“ 23							6.30		
Mayflower	Burpee	“ 23	10	3	9	39	12	13	5.23	21	8
McCollum Hybrid	College	“ 23	1	--	5	9	3	5	5.76	21	--
Miner	Miner(c)	“ 29	5	2	2	8	3	11	7.37	6	5
Minnesota	Dreer	“ 17	39	7	1	89	17	10	3.17	12	3
Money Maker	Landreth (c)	“ 21							5.30		
Novelty 22	“ (c)	“ 19							2.75		
Northern Light	College	“ 29							10.12		
Number 81		“ 29							4.00		
Number 105	Johnson & Stokes(c)	“ 23	13	5	5	20	7	13	6.25	16	--
Optimus	College	“ 21	14	3	5	25	7	3	4.60	24	8
Perfection	Vaughan (c)	“ 23							7.95		
Ponderosa	Henderson(c)	“ 21							7.50		
Potato-leaf	College	“ 27							7.24		
Potato-leaf Ignotum	“	“ 19	21	9	12	34	16	15	7.97	8	4

TOMATOES.—*Concluded.*

Variety.	Seedsman.	Date of first ripening	Fruit ripe Sept. 3.		Fruit ripe Sept. 20.		Average weight of a single ripe fruit.—Ounces.	Weight of green fruit on plant at time of frost.
			No.	Wt.	No.	Wt.		
				lbs. oz.		lbs. oz		lbs. oz.
Potato-leaf Ignotum (Sport)	College	Aug. 21	16	4 7	29	11 10	4.49	4 3
Prelude	Dreer	" 16					2.12	
Purple Cross	Landreth (*c*)	" 23					5.60	
Puritan	Thorburn (*c*)	" 22					6.10	
Ruby	Henderson (*c*)	" 16					3.41	
Seedling	West Va. Station (*c*)	" 29					8.33	
Shah	College	" 27					7.20	
Stone	Vaughan (*c*)	" 27					6.90	
Ten Ton	Landreth (*c*)	" 23	18	5 5	38	11 ..	4.62	
Terra Cotta	Thorburn (*c*)	" 23	23	6 6	40	10 1	4.02	
Thorburn	" (*c*)	" 29					7.80	
Tree	Buckbee (*c*)	" 29					4.75	
Turner Hybrid	Vaughan (*c*)	" 27	1	.. 8	10	4 7	7.10	
Trophy	" (*c*)	" 22	7	2 14	25	9 11	7.05	
Virginia Corker	Landreth (*c*)	" 27					8.75	
Volunteer	Vaughan (*c*)	" 23					6.12	
Yellow Cherry	" (*c*)	" 19						
Yellow Egyptian		" 19					3.70	
Yellow Peach	Vaughan (*c*)	" 21					1.87	
Yellow Plum	" (*c*)	" 16						

NOTES ON VARIETIES.

The following sorts, most of them new, have not been previously described in our bulletins:

Diadem.—The plants were of strong growth and quite free from disease. The fruits are large, round, regular, somewhat flattened. Color a rich red with golden yellow streaks running from base to apex. Unique and handsome in appearance. The flesh is bright in color and of very good quality.

Fiji.—The plant is of healthy, stout, tree growth, closely like *Dwarf Champion* and the fruits closely resemble those of that variety, but are larger in size and darker purple in color. *Dwarf Champion*, while ripening a few fruits early, is rather late to ripen the bulk of the crop. *Fiji* was a few days later in ripening first fruits, but produced a much larger crop before frost than did *Dwarf Champion*, and as the fruits are larger it seems preferable to that variety for the grower.

Honor Bright.—Plants of strong, healthy growth; leaflets small, light yellowish green; leaf-stalk and stems yellow. Distinct in plant appearance, Fruits of medium size, round, flattened, regular form. The color is light green, then white, changing to yellow and finally becoming a rich red when fully ripe. The flesh is very solid, of high quality, and firm, and the variety would be excellent for shipping.

Lemon Yellow.—Plant of *Dwarf Champion* type, though larger and stouter in growth. Fruit round, somewhat elongated in form; color a bright, clear yellow; skin thin; cells quite large, open. Of fair quality.

Mayflower.—Closely resembles Ignotum in plant, but the fruits are scarcely so large and the color is darker red. The tomatoes grow in clusters, color very evenly, do not crack and are of best quality.

Number 81.—Plants are of weak growth and badly defoliated by fungus. Fruits are of medium size, flattened, often quite irregular and yellow in color. The flesh is solid but poor in quality. Some other yellow sorts have larger fruits and are better in quality.

Yellow Egyptian.—Plants of straggling growth and finely cut foliage. Very productive, but the fruits are too small for a yellow sort when there are varieties that have much larger tomatoes.

The following sorts have been grown for two or more seasons:

Acme.—The plants of this well-known variety were of healthy growth and productive. The fruits are large, regular in form and of a popular color. One of the best sorts for the general grower.

Advance.—We have grown this variety for many seasons and have found no better second early sort. The variety is very productive and while the fruits are not large, they are very regular in form and even in ripening. This season the variety was badly attacked by the fungus.

Beauty, *Ignotum*, *Optimus* and *Perfection* are among the best of the large red fruited sorts. *Beauty* and *Optimus* suffered more from fungous attack than did *Ignotum* and *Perfection.*

Dwarf Aristocrat seems preferable to *Dwarf Champion* on account of the larger fruits and the earlier ripening of the bulk of the crop. The fruits, however, are red and have not the dark purple color of *Dwarf Champion.*

Earliest.—We have made a specialty of this variety for several seasons, endeavoring to improve the size and regularity of the fruits without losing anything in earliness. Plants were grown from a strain of seed selected with special reference to early fruiting. Also an attempt will be made to fix a more regular type of oblong and round fruiting sorts. By reference to the table, it will be seen that the early strain produced earlier fruits, but the tomatoes were smaller in size. Earliest has a place to a limited extent, as a first ripening sort. The variety suffered more from *Septoria Lycopersici* than any other sort in the field. *Atlantic*, *Leader* and *Ruby* are much the same in form, but have larger fruits and are a few days later in ripening.

Potato-leaf Ignotum.—Plants of strong growth though somewhat defoliated by fungus. The fruits were larger, and earlier in ripening and the plants more productive than either *Ignotum* or *Potato-leaf.* A very desirable sort for the general grower.

Terra Cotta.—A variety having a thin, velvety skin and flesh of a rich red color and excellent in quality. A fine sort for home use.

SUMMARY OF VARIETIES.

Vaughan's Earliest is one of the best early ripening sorts. *Atlantic*, *Leader*, or *Ruby* closely follow *Earliest* in season and bear larger fruits.

Advance is a most excellent early sort bearing smooth fruits.

Potato-leaf Ignotum, *Acme*, *Beauty*, *Ignotum*, *Perfection* and *Optimus* are excellent sorts for general crop.

Golden Queen is one of the best yellow sorts.

Miner and *Ponderosa* bear large fruits that are very solid and of good quality, but late in ripening.

CABBAGES.

The test of cabbages included a selection from last year's list of twelve early, fourteen medium, and seventeen late varieties.

The seed of the early sorts was sown in boxes, in the forcing house, March 23. The medium varieties were sown April 6. As soon as the plants reached proper size, they were pricked out into flats and remained there until May 17th and 18th, when they were planted in the field.

The late seed was sown in a cold frame, May 18. The young plants were thinned to the proper distance and remained in the bed until they were transplanted in the field, June 26.

Variety.	Seedsman.	Season.	Date.		No. of days from tran-planting to maturity.	Number of plants headed.	Total weight.	Average weight.
			First mature head.	Market maturity.				
All Head	Burpee	Early	Aug. 2	Aug. 12	87	9	31.5	3.5
All Head	Vaughan	"	" 2	" 12	87	6	24	4
Bullock Heart	Landreth	"	" 1	" 10	85	11	33	3
Early Spring	Vaughan	"	" 2	" 10	85	14	42	3
Early York	King	"	" 2	" 8	83	7	17	2.43
Express	Vaughan	"	" 3	" 14	89	10	30	3
Henderson's Summer	"	"	July 27	" 8	81	10	30	3
Landreth's Earliest	Landreth	"	" 28	" 10	82	5	16	3.2
Reedland Drumhead	"	"	" 26	" 12	80	11	44	4
St. John's Day	Henderson	"	" 28	" 10	82	12	30	2.5
Wakefield, Early Jersey	Vaughan	"	Aug. 2	" 10	87	9	36	4
Winnigstadt	Ferry	"	" 4	" 16	89	8	20	2.5
All the Year Round	Landreth	Medium	" 10	" 19	93	3	9	3
Autumn King	Henderson	"	" 10	" 19	93	10	40	4
Ball Head	Burpee	"	" 19	" 23	97	9	30	3.33
Braunschweiger	Salzer	"	" 19	" 24	98	4	14	3.5
Long Island	Brill	"	" 15	" 20	94	6	22	3.66
Lupton	Burpee	"	" 16	" 20	94	1	--------	5.5
Mid-Summer	Maule	"	" 14	" 20	94	11	52	4.72
Salzer's Ideal	Salzer	"	" 2	" 10	84	14	94	6.71
Short Stem	Henderson	"	" 10	" 20	94	6	28	4.6
Succession	"	"	" 12	" 20	94	8	47	5.62
Sugar Head	Vaughan	"	" 16	" 26	100	9	33	3.66
Sure Head	Burpee	"	" 14	" 25	99	9	55	6.1
Vandergaw	Vaughan	"	" 2	" 14	88	6	18	3
World Beater	Burpee	"	" 12	" 20	94	5	20	4
Champion Drumhead	King	Late	Oct. 1	*Nov. 10	97	8	71.68	8.71
Colossus	Salzer	"	" 1	" 10	97	25	258.45	10.39
Danish Ball	Burpee	"	Sept. 28	" 10	94	22	258.5	11.75
Diamond Winter	Gregory	"	Oct. 4	" 10	101	23	184.69	8.03
Dutch Winter	Vaughan	"	" 10	" 10	106	23	114.31	4.97
Flat Dutch	Ferry	"	" 15	" 10	111	22	121	5.5
Hollander	Buckbee	"	" 1	" 10	97	20	137.5	6.87
Ideal Winter		"	" 2	" 10	98	18	108.5	6.03
Late Mountain	Landreth	"	" 15	" 10	111	10	71	7.1
Mammoth Rock	Johnson & Stokes	"	" 14	" 10	110	21	102	4.85
Mammoth Rock Head	" " "	"	Sept. 29	" 10	96	19	90.5	4.16
N. B. G. & Co. 100 Weight	N. B. G. & Co.	"	Oct. 4	" 10	100	15	87	5.8
New Rock Head	Johnson & Stokes	"	" 2	" 10	98	25	159.15	6.39
Premium Flat Dutch	Ferry	"	" 8	" 10	104	24	131	5.45
Red Drumhead	"	"	" 4	" 10	100	18	114.5	6.37
Stone Mason	Vaughan	"	Sept. 30	" 10	95	19	142.7	7.3
Warren	Gregory	"	Oct. 1	" 10	97	21	118.86	5.66

* Date harvested.

The early and medium varieties were watered by surface irrigation, when the heads were about half grown, and again ten days later. They were planted in rows three and one-half feet apart using twenty plants of each variety, the plants having a space of twenty inches in the row. In the late plot, twenty-five plants were used, and water was applied several times.

The cabbage maggot (*Phorbia Brassicæ*) attacked the early and medium varieties, and destroyed many of the plants.

The tables include the varieties that were most promising last year and proved true to name.

A collection of the best early varieties might include: Henderson's *Early Summer*, *Wakefield*, *Early Drumhead*, *All Head* and *Early York*, all of which produce large, well formed, solid heads of fine quality.

Among the best medium varieties, some of which produce heads equal to the winter sorts, are: *Autumn King*, *Lupton*, *Mid-Summer*, *Succession* and *World Beater*.

NOTES ON LATE VARIETIES.

Champion Drumhead, from John K. King, Coggeshall, Essex, England, is of the Drumhead type, but the seed was slightly mixed as a few of the plants produced large, loose, flabby heads.

The typical heads were broad, deep and flat, tender, crisp, and very white. It is a strong, rank grower, and has a large amount of superfluous foliage covered with a greenish-purple bloom; stem, short and stout. If true to type, it would be of value as a late variety.

Colossus, sent out by Salzer, is a strong growing and sure heading variety that has gained prominence on account of its large, firm, crisp heads, and excellent keeping qualities.

Danish Ball, from Burpee, a strong plant, true to type. The heads are of good size, round, solid, crisp and tender. The stem is of medium length, rather slender and weak; foliage thick, leathery, covered with a light blue bloom, and sets closely around the heads.

A good variety for a firm, round medium sized head, possessing rare keeping qualities.

Diamond Winter, one of Gregory's specialties, produced very large, solid heads of the *Flat Dutch* type. The plants were strong; foliage light green with bluish white bloom. Heads broad, flat, true to type and were well covered with leaves; stem short, stout.

Dutch Winter from Vaughan, and *Buckbee's Hollander* are nearly identical, except that *Dutch Winter* set a few more heads.

The plants were strong, making a rank growth; heads small, round, very hard, deeply set in an extra amount of leaves; foliage thick, greenish purple covered with a blue white bloom; stem short and stout. Very much like the *Danish Ball*. All three varieties possess qualities that make them desirable for winter use.

Flat Dutch and *Premium Flat Dutch* from D. M. Ferry & Co. are standard late varieties with which other sorts are compared.

The plants are hardy; heads large, broad, flat, and deep, of a bluish green color and when cut open, are crisp and tender, and have a pleasant flavor. The leaves are thick, of bright green color and covered with light blue bloom; stem short, stout.

These varieties should be grown in every home garden, owing to their hardiness and their edible and keeping qualities.

Ideal Winter is one of A. W. Livingston's Sons' novelties that proved to be of value either for immediate use, or keeping purposes.

The plants seemed to be strong growers, not easily affected by dry weather. The heads were medium to large, true to the type of the *Drumhead*, broad, flat, deep, very crisp and tender; foliage thick, light green with a purple border. The superfluous leaves are numerous. A variety worthy of trial.

Late Mountain, Landreth, is a strong growing, short-stemmed variety that developed rather soft, medium-sized heads, covered with a large amount of extra foliage.

The leaves are thick, glaucous, and of a dark green color; stems short and stout.

Mammoth Rock and *Mammoth Rock Head*, both from Johnson & Stokes, showed no marked difference. They produced strong-growing plants with short, stout stems.

The heads were of good size, round, solid, of deep red color, tender and of fine flavor; foliage thick, covering the heads; color deep purple with light blue bloom, making them very attractive in the garden.

N. B. G. & Co. Hundred Weight, introduced by Northrup, Braslan & Goodwin Co., is a very large cabbage of the *Flat Dutch* type, but has a tendency to form rather loose heads. The quality is good and if grown firm they are valuable.

New Rock Head, one of Johnson & Stokes' recent introductions, proved to be one of the surest headers in the test.

The plants are very strong, vigorous growers, with a deep root growth. The heads are large, broad, flat, very solid, and the quality is hard to excel; foliage is thick, light green with blue white bloom and covers the head. The leaves set low on the stalk leaving a short, stout stem. A variety of much promise.

Red Drumhead, sent out by Ferry, proved to be one of the best red varieties. The heads are medium to large, firm, of good quality and deep red in color. A marked difference between this and the other red sorts, was in the shape of the heads, which are of *Drumhead* type, while most of the other sorts are round.

Stone Mason, Vaughan, possesses qualities that make it a desirable sort for the gardener or home grower.

The plants are strong and develop a large per cent of heads. The heads are of good size, firm, crisp and tender, with a mild flavor; foliage thick, light green, with blue white bloom, branching low from a short, stout stem.

Warren, from J. J. H. Gregory & Son, is of the *Drumhead* type and proved to be very true.

The heads are deep, solid, and of fine quality; foliage light colored, tinted with purple near the edges, thick, leathery, glaucous and well lapped over the head; very few are superfluous. The stem is short, stout, holding the head erect.

INSECTS AND DISEASES OF THE CABBAGE.

The growing of cabbages, cauliflower and other vegetables of this family is becoming somewhat uncertain, owing to the prevalence of various insects and diseases, which attack and in many locations completely destroy them.

For several years the cabbage maggot (*Phorbia Brassicae*) has seriously affected the growth of the young plants in this vicinity, and has continued its depredations after the plants are placed in the field. As a preventive, care should be taken that fresh soil is used for growing the plants, and that the land on which the plants are set is at some distance from that on which cabbages, onions, radishes, or turnips were grown the previous year.

A good way to combat this enemy is to mix a small quantity (a tablespoonful) of kerosene or turpentine with a peck of wood ashes and scatter over the ground near the plants; this prevents the mature insect, which is a small brown fly, from depositing its eggs upon the stems of the plants.

Kerosene emulsion and bi-sulphide of carbon have been used very successfully, and some growers advocate the placing of a circle of tarred paper around the plant, leaving it until the danger limit is passed.

The Club root, sometimes called club foot, has been for many years, a troublesome disease on the cabbage as well as on the turnip in the Eastern States and has appeared in several places in Michigan. It attacks the plants at the root and causes large swellings, which both absorb the nutriment of the plant and girdle the stem, thus checking the growth and causing it to turn yellow and die.

One strong symptom of this trouble, is the rank, disagreeable odor of decay which it gives the roots. There has been no remedy discovered for this disease, but to avoid the growing of cabbage, in succession on the same soil, and the use of the manure that contains cabbage refuse will keep it in check, and generally prevent it altogether.

In the vicinity of Racine, Wisconsin, a bacterial disease of the cabbage developed itself several years ago, and in 1896, caused heavy losses to the growers. It also injured crops in other localities.

This year it caused more trouble on the cauliflower than upon the cabbage, *Kale* or *Kohl Rabi.* The symptoms of the disease are small yellow spots, which appear on the leaves and spread over the entire surface of the leaves. The leaves droop, and a black rot soon destroys the heads.

This disease may be carried by the seed from one section to another, and when once established, the successful growing of plants of the cabbage family is nearly impossible. The destruction of all diseased plants as soon as found by burning them, seems to be the only way to hold it in check.

Cabbages are often much injured by so-called cabbage worms which feed upon the leaves, and if undisturbed may destroy the heads. They often appear early in the season before the heads have begun to form and at that time can be readily killed by the use of Paris green, or other arsenites, at the rate of one ounce to fifteen gallons of water, or with plaster or flour at the rate of one pound to one hundred. Care should be taken not to use these poisons after the heads have formed, as the danger increases as the time of ripening approaches. Should the worms appear late in the season, pyrethrum or saltpetre at the rate of a teaspoonful to a gallon of water can be used, with good results and without danger. The worm can also be destroyed by pouring hot water upon the leaves. Especially in dry seasons cabbages are often much injured by lice which may appear in immense numbers upon the leaves. As a rule, they are on the under side and in the folds of the leaves so that it is difficult to reach them with an insecticide. The prompt and thorough use of kerosene emulsion, or strong tobacco water, will aid in holding them in check, but it will be even more satisfactory to so handle the crop that the lice will not be likely to appear. When from any cause the plants are checked in their growth, we may expect the rapid development of the lice, and the danger can be lessened if land that is not likely to suffer in time of drought is used, especially for the late varieties, and if frequent shallow cultivation is given.

CAULIFLOWERS.

Seven varieties comprised the test in cauliflowers.

The seed and plants were handled the same as the cabbage varieties in the forcing house, and twenty-five plants of each variety were planted in the field June twenty-fifth.

Algiers from Henderson, produced some large, solid heads of fine quality, being tender and of mild flavor.

Salzer's *Blue Ribbon* was one of the first to mature well formed heads of good quality and seems to be worthy of further trial.

California Wonder, introduced by Vaughan, grew the largest plants in the test, but failed to develop heads. The hearts of the plants were a curled mass of broad, irregular leaves. Perhaps it would form heads where the season is a little longer.

Chief, one of Buckbee's introduction proved to be a valuable variety. It is early and grows a solid, compact crisp head on a short stalk. The leaves are numerous and have an upright growth which covers the head and protects it from the sun, thus leaving it a pure white, without being blanched by tying the leaves together, as is necessary with most of the other varieties.

Erfurt, sent out by Vaughan, is a standard early variety and matures good sized heads of fine quality.

Erfurt and *Puget Sound* sent by H. A. March, Fidalgo, Washington, proved to be much alike. They are strong growing plants and produced a much larger per cent of heads than any other sort. The heads are even and symmetrical and the quality is up to the standard. They should be classed among the best.

The same varieties of *Kale* and *Kohl Rabi* were grown as last year. The season was not as favorable for their growth but by the use of the irrigating system, equally as good plants were grown, and they were much relished by people familiar with their use.

Variety.	Seedsman.	Season.	Date.		Number of days from transplanting to maturity.	Number of plants headed.	Total weight.	Average weight.
			First mature heads.	Market maturity.				
Algiers	Henderson	Early	Aug. 30.	Sept. 15.	82	12	45.	3.75
Blue Ribbon	Salzer	Medium	Sept. 10.	" 30.	97	14	45.5	3.25
California Wonder	Vaughan	Late						
Chief	Buckbee	"	Sept. 25.	Oct. 10.	107	18	95.4	5.3
Erfurt, Dwarf	Vaughan	Early	Aug. 25.	Sept. 15.	82	15	60	4
Erfurt, Large	March	Late	Sept. 10.	Oct. 1.	98	23	126.5	5.5
Puget Sound	"	"	" 12.	" 1.	98	24	138	5.75

SWEET CORN.

The varieties of sweet corn numbered thirty-one and included most of the new kinds sent out by different seedsmen; but the majority are standard sorts that need no description to establish their value to the truck gardener, or their usefulness in the home garden.

The seed was planted May 26, in rows three and one-half feet apart, using five kernels for each hill. The cold, wet weather that followed, made germination slow and some of the seed rotted.

TABLE OF VARIETIES.

Number.	Variety.	No. of ears per square rod.	No. days from planting to edible maturity.	Height of stalks.—Feet.	Average.		No. of rows of kernels per ear.	Length of kernels.—Inches.	Diameter of cob.—Inches.	Average weight of ears.—Ounces.
					No. of ears per stalk.	Length of ears.—Inches.				
1	Adams	116	73	5.	.92	7.5	12	.375	1.	6.8
2	Bonanza	78	97	7.	.79	8.	12	.5	1.	9.1
3	Champion	50	84	6.	.65	8.	12	.375	1.	7.
4	Chicago Market	52	75	5.	.62	7.	12	.375	1.125	5.6
5	Columbus Market	75	92	7.	.78	8.5	14	.375	1.25	8.
6	Concord	62	78	5 to 6	.52	10.	12	.375	1.	8.
7	Cory. (Mammoth White)	95	72	4.5	.88	6.5	16	.43	1.	5.6
8	Country Gentleman	98	105	7.5	.87	7.5	18	.5	1.	6.9
9	Dawn	85	92	6.5	.58	7.	14	.3125	1.125	6.8
10	Early Sugar	102	78	6.	.64	8.	12	.375	1.	6.4
11	Egyptian	87	103	6 to 8	.64	9.	12	.5	1.	8.5
12	First of All	38	74	4 to 5	.53	6.5	10	.375	1.	4.8
13	Fordhook	92	70	5.	.75	7.	8	.5	1.	4.8
14	Fottler	71	76	4 to 5	.61	7.5	12	.375	1.	6.4
15	Giant	73	81	5 to 6	.6	9.	14	.43	1.25	8.8
16	Gold Coin	91	103	8.	.84	9.	14	.5625	1.125	9.
17	Hance	135	96	7.	.55	7.5	10	.375	.875	8.
18	Honey Dew	71	97	8.	.61	8.	12	.3125	1.	7.
19	La Crosse	84	71	5.	.7	7.5	8	.375	1.	6.
20	Landreth Market	111	84	6 to 7	.81	8.	10	.3125	1.	6.8
21	Landreth Sugar	95	96	8.	.69	9.	14	.375	1.125	8.
22	Leet	47	80	5.	.66	8.	10	.3125	1.25	8.
23	Mammoth	72	106	7 to 8	.85	9.5	14	.375	4.315	9.
24	New England	76	78	5 to 6	.58	8.	8	.3125	.875	5.6
25	Old Colony	76	97	6.5	.7	8.5	16	.43	1.25	8.
26	Pee and Kay	71	82	6.	.68	8.5	14	.3125	1.25	8.4
27	Quincy	104	73	5.	.81	7.5	12	.3125	1.125	6.4
28	Roslyn	128	94	7.	.68	9.5	12	.3125	1.125	7.1
29	Ruby	85	97	7.	.59	9.0	14	.3125	1.125	8.
30	Stowell	71	92	7.	.71	10.	16	.625	1.	8.5
31	Twenty Day	14	70	4.	,3	6.5	8	.3125	1.	5.6

The three varieties sent out by A. W. Livingston's Sons of Columbus, Ohio, proved to be particularly promising.

Columbus Market, grows a strong stalk well covered with long, broad foliage. The ears are symmetrical, maturing about the season of Stowell, and equal it in quality.

Giant, proved to be a very large early corn; ears of good length and well filled with broad kernels of large size and high quality.

This promises to be of especial value for the home garden, as the length of edible maturity is much prolonged by the vines still continuing to bloom when the first pods are edible.

CLASS III.—Half dwarf varieties, two to four feet high. Peas smooth or indented; white or cream; pods straight or nearly so. *Stratagem* will represent this class.

Alpha, from D. M. Ferry & Co., grew rather spindling vines that seemed to be rather easily affected by dry weather.

The pods were numerous, of good size and shape, but not well filled. The peas were fair size, plump, tender, and contained a medium amount of sugar.

Eclipse, introduced by Vaughan.

Vines are strong, of medium size, and well covered with dark-colored foliage. Pods are short, plump, and very even, nearly all maturing at once. Peas round, plump, tender and sweet.

Epicure's Delight, introduced by Salzer. A very quick growing variety, with medium-sized vines.

The vines are dark green in color, appear to be strong and hardy and produce a large amount of broad pods, tapering from the stipules to about the center, and blunt at the apex. Peas large, of irregular round shape, sweet and tender.

Orion grew medium sized, light colored vines well set with pods that contained comparatively few peas. The pods were pointed at both base and apex and contained a few peas of medium quality.

CLASS IV.—Vines dwarf; seeds green, bluish green, white or cream colored; seeds shriveled; pods straight or nearly so.

First and Best from Ferry, was the first to reach edible maturity. The vines were of medium size, strong growers, but began to die as soon as the peas reached edible maturity, thus shortening the length of their usefulness. Pods are plump, regular shape and well filled with large peas that seem to have a rather tough skin; flavor good. A good early variety, which can be taken as the type of this class.

Scorcher, received from Salzer, is an early quick grower, with straight pods of good size, well filled with peas of high quality. The vines are of medium size, branch close to the ground, and the well-filled pods are borne abundantly. Peas are of medium size, tender, and of good quality for an extra early variety.

POTATOES, 1897.

The experimental plot for potatoes was located on the north side of the garden; a part of it was used for potatoes in 1896, the balance being a turned under strawberry bed.

The soil is rather diversified, ranging from a black loam, mixed with quicksand to a light sand with a clay subsoil, but the plots were so arranged that the test was a fair one. Although the seed was treated with corrosive sublimate solution (1-2000), the crop of tubers showed more scab than last year, especially on the portion where potatoes had been previously grown. The weather furnished the proper conditions for the development of the scab germs, and had the seed not been thoroughly disinfected the loss would probably have been much greater.

A heavy coating of finely composted manure was plowed under in the fall and the land was replowed in the spring and finely pulverized with the Acme harrow and rolled, which placed the soil in a fine tilth for the young plants.

TABLES OF VARIETIES.—*Plot Planted May 11.*

Variety.	Date of maturity.		Yield per acre, bushels.			Average yield for 1896, 1897.	General average.	No. of years averaged.
	Edible.	Market.	Large.	Small.	Total.			
Acme	Aug. 5	Aug. 25	114.03	15.55	129.58	146.42	146.42	2
Algoma	" 1	" 25	62.2	36.28	98.30	--------	--------	1
Belle	" 25	Sept. 14	150.31	31.1	181.41	176.52	176.52	2
Blush	" 28	" 2	62.2	31.1	93.3	--------	--------	1
Bovee (Dep't)	" 24	" 2	119.21	46.65	165.86	146.39	185.76	3
Bovee (Hend.)	" 24	" 6	93.3	36.28	129.58	--------	--------	1
Freeman	" 20	" 10	119.21	20.73	139.94	130.87	183.75	7
Hicks' 81	" 20	" 1	77.75	31.1	108.85	124.41	186.3	6
Honeoye Rose (Dep't)	" 18	" 2	101.07	25.91	126.98	107.54	--------	2
Irish Cobbler	" 5	Aug. 25	196.96	41.46	238.42	223.67	--------	2
June Eating	" 20	Sept. 12	129.58	20.73	150.31	126.98	189.61	8
Kansas	Sept. 1	" 14	134.76	25.91	160.67	--------	--------	1
King of the Earlies	Aug. 1	Aug. 20	67.38	10.36	77.74	82.97	123.48	3
Michigan	" 20	Sept. 1	108.85	31.1	139.95	184.41	--------	2
Norther	" 25	" 8	124.4	38.87	163.27	178.02	--------	2
Peachblow	" 20	" 10	142.54	20.73	163.27	151.6	212.33	3
Pinkeye (Dep't)	" 22	" 4	132.17	20.73	152.90	155.49	--------	2
Pinkeye (Read)	" 27	" 8	67.38	31.1	98.48	--------	--------	1
Pride	" 18	" 6	82.93	38.87	121.80	149.01	--------	2
Quick Crop	" 22	" 5	62.2	31.1	93.3	126.48	--------	2
Read's 86	" 24	" 5	57.1	31.1	88.11	114.02	129.35	3
Six Weeks	" 16	" 1	137.35	20.73	158.08	--------	--------	1
Snowball	" 28	" 10	103.66	23.32	126.98	--------	--------	1
Thoroughbred	" 10	" 6	67.38	31.1	98.48	115.33	--------	2
Trumbull	" 18	" 4	49.24	36.28	85.52	--------	--------	1
Vaughan	" 14	Aug 20	106.25	33.69	108.85	103.16	135.05	5
White Lily	" 16	Sept. 10	93.3	18.14	111.44	104.96	138.3	3
White Ohio	" 1	Aug. 15	57.01	23.32	80.33	--------	--------	1
Woodbury	Sept. 1	Sept. 16	93.3	51.83	145.13	168.45	--------	2
Woodhull	Aug. 20	" 8	209.92	31.1	241.02	--------	--------	1
241-3	" 1	Aug. 20	57.01	15.55	72.56	126.98	--------	2

Plot Planted June 4.

Variety.	Date of maturity.		Yield per acre, bushels.			Average yield for 1896, 1897.	General average.	No. of years averaged.
	Edible.	Market.	Large.	Small.	Total.			
Abundance	Sept. 5	Sept. 16	129.58	31.1	160.68	222.88	--------	2
Accidental	" 4	" 16	176.22	25.9	202.72	--------	--------	1
Adirondac	" 12	" 17	165.86	20.73	186.59	176.21	--------	2
Alexander Prolific	" 10	" 17	72.56	5.18	77.74	207.31	195.3	4
American Beauty	" 10	" 17	67.38	10.36	77.74	186.58	--------	2
American Wonder	" 6	" 14	77.75	25.91	103.66	69.95	184.48	6
Andes	Aug. 20	" 1	59.6	15.55	75.15	--------	--------	1
Arizona	Sept. 15	" 17	67.38	41.46	108.84	--------	--------	1
Battle's Best	" 10	" 17	134.76	15.55	150.31	--------	--------	1
Beauty of Beauties	" 12	" 17	155.5	10.36	165.86	--------	--------	1
Blush	" 10	" 17	93.3	36.28	129.58	--------	--------	1
Breck's Chance	" 6	" 15	57.01	15.55	72.56	111.43	114.04	3
Bristol Beauty	" 18	" 17	67.38	23.32	90.7	--------	--------	1
Burr No. 1	" 12	" 17	98.48	25.91	124.39	--------	--------	1
Carman No. 1	" 10	" 17	165.86	23.32	189.18	163.36	188.8	4
Carman No. 3	" 10	" 17	147.72	20.73	168.45	247.49	258.41	3
Cayuga	" 8	" 16	106.25	28.5	134.76	300.41	207.7	6
Champion of the World	" 3	" 12	62.2	18.14	80.34	265.64	--------	2
Clarendon Beauty	" 8	" 16	67.38	10.36	77.74	--------	--------	1

Plot Planted June 4.—Concluded.

Variety.	Date of maturity.		Yield per acre, bushels.			Average yield for 1896, 1897.	General average.	No. of years averaged.
	Edible.	Market.	Large.	Small.	Total.			
Columbus	Sept. 10	Sept. 17	124.4	33.69	158.09	-------	-------	1
Endurance	" 12	" 17	57.01	12.95	69.96	-------	-------	1
Enormous	" 12	" 17	165.86	2.59	168.45	353.75	-------	2
Fillbasket	" 6	" 14	82.93	5.18	88.11	165.86	184.28	6
Flagle	" 4	" 12	67.38	15.55	82.93	176.23	-------	2
Fottler's Peachblow	" 12	" 17	88.11	25.91	114.03	236 97	-------	2
General Purpose	" 8	" 14	103.66	18.14	121.8	221.58	-------	2
Good Times	" 8	" 15	134.76	41.46	176.22	-------	-------	1
Harrington Peer	" 1	" 16	259.16	41.46	300.62	-------	-------	1
Harvest Queen	" 4	" 10	77.75	38.87	116.62	229.36	-------	2
Hicks 22	" 8	" 14	88.11	7.77	95.88	281.18	223.88	6
Hicks 101	" 10	" 17	145.13	23.32	168.45	272.11	243.7	6
Honeoye Rose	" 6	" 14	98.48	15.55	114.03	101.07	-------	2
Irish Mignon	" 10	" 17	77.75	10.36	88.11	-------	-------	1
Joseph	" 6	" 14	57.01	41.46	98.47	-------	-------	1
King of the Roses	" 4	" 14	72.56	15.55	88.11	124.49	-------	2
Klondyke	" 8	" 14	165.86	46.65	212.51	-------	-------	1
Leonard	" 6	" 14	51.83	51.83	103.66	-------	-------	1
Lightning Express	" 1	" 10	88.11	25.91	114.02	141.23	179.74	4
Lincoln	" 6	" 15	114.02	46.65	160.67	-------	-------	1
Livingston Banner	" 8	" 15	121.8	23.32	145.12	286.37	-------	2
Long Keeper	" 15	" 17	134.76	25.91	160.67	-------	-------	1
Maggie Murphy (Department)	" 12	" 17	103.66	10.36	114.02	261.74	-------	2
" " (Brown)	" 12	" 17	155.5	10.36	165.86	-------	-------	1
Michigan Beauty	" 8	" 15	25.91	18.14	44.05	81.64	-------	2
Mill's Banner	" 8	" 15	207.33	25.91	233.24	-------	-------	1
" Prize (Butcher)	" 12	" 17	137.35	15.55	152.9	-------	-------	1
Milwaukee	" 6	" 14	103.66	36.28	139.94	124.39	168.86	4
Napoleon	" 12	" 17	67.38	28.5	95.89	263.05	-------	2
O. K. Mammoth	" 6	" 14	67.38	15.55	82.93	199.55	195.76	7
On Top	" 8	" 14	77.75	25.91	103.66	248.40	174.21	6
Onward	" 4	" 12	72.56	23.32	95.88	-------	-------	1
Orphan	" 1	" 10	108.85	15.55	124.4	133.46	203.97	3
Paddleford	" 10	" 17	103.66	44.05	147.71	-------	-------	1
Peachblow	" 14	" 17	103.66	25.91	129.57	282.48	-------	2
Perfection	" 2	" 10	119.21	31.1	150.31	-------	-------	1
Planet Jr.	" 10	" 17	145.13	20.73	165.86	-------	-------	1
Pride of Seneca	" 6	" 14	103.66	31.1	134.76	-------	-------	1
Queen of Paris	" 6	" 14	51.83	15.55	67.38	218.99	220.09	7
Queen of the Valley	" 8	" 16	75.15	12.95	88.1	-------	-------	1
Read's 99	" 10	" 17	114.03	20.73	134.76	-------	-------	1
Rose No. 9	" 4	" 12	57.01	25.91	82.92	132.16	-------	2
Rose of Erin	" 6	" 12	93.3	28.5	121.8	-------	-------	1
Rose Standish	" 4	" 12	98.48	31.1	129.58	152.9	-------	2
Rural New Yorker No. 2	" 8	" 14	129.58	31.1	160.68	321.36	191.74	8
Rutland Rose	" 6	" 14	98.48	15.55	114.03	256.57	-------	2
Seedling No. 2 (Teeter)	" 8	" 17	57.01	15.55	72.56	-------	-------	1
Sir Walter Raleigh	" 8	" 14	134.76	18.14	152.9	-------	-------	1
Snowflake Jr.	" 1	" 10	114.03	20.73	134.76	145.12	-------	2
Suffolk Beauty	" 4	" 14	114.03	28.5	142.53	-------	-------	1
Table King	" 2	" 10	36.28	20.73	57.01	108.84	-------	2
Uncle Sam	" 1	" 9	150.31	25.91	176.22	152.89	-------	2
Unknown	" 10	" 17	72.56	15.55	88.11	95.85	-------	2
Vanguard	" 2	" 12	77.75	10.36	88.11	243.61	221.43	4
Victor Rose	" 10	" 17	64.74	10.36	75.1	143.8	177.02	4
Vigorosa	" 1	" 10	129.58	36.28	165.86	144.12	-------	2
White Gem	" 2	" 10	57.01	15.55	72.56	196.96	227.97	3
" Peachblow	" 14	" 17	93.3	25.91	119.21	-------	-------	1

The early plot was marked May 11, with furrows forty-two inches apart, and each variety was given a forty-foot space in the row; two pounds of seed of each variety were cut into twenty-five pieces, which were dropped by hand about eighteen inches apart, and covered to the depth of four inches. After planting, the ground was rolled, and as soon as the small weeds began to start, Breed's weeder was used at intervals of three to four days, thus keeping the surface loose and aiding in preventing evaporation as well as keeping the weeds down. This method of cultivation was kept up until the plants reached a height of from six to seven inches, after which the Planet Jr. cultivator was used weekly, or after each rain until the vines covered the ground. At all times shallow, level cultivation was given

The late varieties were planted June 4, and cultivated in the same manner. Among the potatoes received from the different seedsmen were several varieties, the season of which was not known, and for comparison the seed was divided equally between the two plantings.

The tables show the results obtained.

The new varieties grown in the test this year were obtained from the following parties:

E. Tully, Penza, Ohio.—*Trumbull;* H. C. Marsh, Muncie, Ind.—*Andes;* Peter Henderson & Co., 35-37 Cortland St , N. Y.—*Uncle Sam, Bovee,* and *Sir Walter Raleigh;* D. M. Teeter, Bellaire, Ohio.—*Seedling No. 2;* F. Barteldes & Co., Lawrence, Kan.—*Kansas;* S. F. Leonard, Chicago, Ill.—*Leonard;* J. M. Thorburn & Co., N. Y. —*White Peachblow;* Wm. Henry Maule, Philadelphia, Pa.—*Beauty of Beauties*; Jas. Vick's Sons, Rochester, N. Y.—*White Ohio* and *Vick's Perfection;* L. L. Olds, Clinton, Wis.—*Joseph;* F. B. Mills, Rose Hill, N. Y.—*Mills' Banner, Irish Mignon,* and *Long Keeper;* Frank Ford & Sons, Ravenna, Ohio.—*Lincoln* and *Columbus;* Geo. W. P. Jerrard Co., Caribou, Me.—*Stray Beauty*; E. J. Smith, Paddleford, N. Y.—*Smith's Six Weeks, Burrs No. 1, Paddleford;* John A. Salzer, La Crosse, Wis.—*Good Times;* C. C. Brawley, New Madison, Ohio. —*Endurance, Algoma, Arizona, Queen of the Valley* and *Onward;* T. H. Glover, Mancelona, Mich.—*Harrington's Peer;* B. W. Steere, Carthage, Ind.—*Accidental;* E. W. Butcher, Albion, Mich.—*Mills' Prize;* Galusha D. Oathout, Wolcott, N. Y.—*Clarendon Beauty;* R. H. Brown & Co., Victor, N. Y.—*Blush, Honeoye Rose, Planet Jr., Maggie Murphy, Rose of Erin, Pride of Seneca, Woodhull;* Wm. Myers, Mears, Mich.—*Klondyke;* Dison J. Porter, Three Rivers, Mich.—*Battles' Best;* F. W. Read, Grand Rapids, Wis.—*Early Snowball, Early Pinkeye, Bristol Beauty, Suffolk Beauty, Read's 99.*

SUMMARY.

The new varieties that promise to become standard sorts, are found in the following lists.

Early Varieties.

Among the varieties maturing first, *Irish Cobbler* (238.42 bu.) takes the lead and increases its yield of last year. *Six Weeks* (158.08 bu.), *Algoma* (98.30 bu.) and *White Ohio* (80.33 bu.) are very promising extra early sorts.

Medium.

The medium sorts gave the largest yields this year. *Harrington's Peer* planted June 4, was mature September 1, and yielded (300.62 bu.) per acre, *Woodhull* (241.02 bu.), *Accidental* (202.51 bu.), *Uncle Sam* (176.22 bu.) and *Klondyke* (212.12 bu.) gave nearly as good results and are excellent in quality.

LATE VARIETIES.

Frost killed the vines September 17, and though it did not affect the edible qualities of the tubers, it checked the growth of the late sorts and is a partial cause of the small yield. *Mills' Banner* (233.24 bu.), *Good Times* (176.22 bu.), *Planet Jr.* (165.86 bu.) and *Sir Walter Raleigh* (152.9 bu.) were among the large yielders among the new varieties, but others of less recent introduction, including *Carman No. 1*, (189.19 bu.), *Carman No. 3* (168.45 bu.), *Enormous* (168.45 bu.), *Rural N. Y. No. 2* (160.68 bu.), *Peachblow* (129.57 bu.), *Livingston Banner* (145.12 bu.) and *Beauty of Beauties* (165.86 bu.) are productive and good keepers.

NEW VARIETIES.

Accidental.—A medium early variety of excellent quality and quite productive. Tubers, medium to large; shape irregular, oblong; eyes numerous, evenly distributed, long, narrow, slightly sunken, and strong sprout centers; skin smooth, netted in patches, rose tinted; flesh cream white, firm, dry and fine grained. Vine stout, spreading, rather long.

Algoma.—A new variety of the Hebron class originated in Minnesota, that is worthy of further trial; size medium; shape oblong and a little flattened, with broad, open, shallow eyes, located mostly on the seed end; lip well marked but not prominent, skin white, smooth, with slight traces of russet; flesh firm, of good texture, dry; fairly productive. Vines short, spreading, stems green. A variety that possesses superior qualities and promises to be a valuable early home or market sort.

Andes.—Size medium to large; shape ovate to oblong; eyes numerous, narrow, pinkish, rather shallow, evenly distributed over the entire surface; skin delicate light pink with russet appearance; flesh firm, white, fine grained, very dry. Vines upright, rather short. It was grown under unfavorable conditions and gave only a small yield. Said to be a productive early sort.

Arizona.—One of the Rose type with strong, vigorous vines. Tubers small to medium, oblong, irregularly flattened; eyes numerous, of medium depth; broad, with well marked lip, having a slight protuberance from the middle of the curve; skin netted, thin, white; flesh white, firm, of fine texture and dry. Vines spreading, rather long. Season medium; yield rather small. Will be given further trial.

Battles' Best.—The tubers are medium to large; shape round, slightly flattened; eyes numerous, broad, shallow, cream-tinted, well scattered over the surface; skin cream-tinted, russet and thin; flesh coarse, irregularly veined, whitish, firm but a little watery. It would probably have been more productive had it matured before the frost killed the vines. Vines tall, slender, nearly upright.

Beauty of Beauties.—A new variety with promising characteristics. Season medium to late; quite productive. Size medium; shape ovate to oblong, flattened; eyes broad, shallow, white; lip not prominent though well marked; skin pale pink, slightly netted; flesh white, fine grained, rather soft and watery. Vines quite tall, strong, upright. Owing to its handsome appearance it will be included in the list for further trial.

Blush.—A medium late variety with strong, rank growing vines. Size, medium to large, round to oblong; eyes small and shallow, well distributed; sprout center strong and pink in color; skin pink, netted; flesh white, dry, firm, fine texture. Stems dark green, spreading, medium length. Productiveness above the average. This variety has the markings of a fine potato and will be carefully watched in the future.

Bristol Beauty.—A variety introduced from Wisconsin. Tubers rather small, oblong, regularly flattened; eyes long, shallow with a well marked sharp lip, pink in color; skin pinkish white, slightly russeted; flesh veined through the center, firm, fine texture, dry. Season medium, somewhat lacking in productiveness. Stems rather long, spreading.

Burr No. 1.—This variety possesses characteristics, that in many localities will make it a desirable sort. It is of good size, fine quality and productive, as well as a good keeper. Stems rather short, spreading.

Clarendon Beauty.—A new variety originated in Clarendon, Orleans County, N. Y. Tubers medium size, oval, flattened; eyes long, broad, open, shallow; color pinkish white with a strong sprout center; skin rose-tinted, finely netted; flesh white, firm, fine grained and dry. Stem tall, nearly erect. Season medium late; lacking in productiveness. Seems to be worthy of further trial as it is quite attractive and possesses some superior qualities.

Columbus.—A variety with strong rank vines, not seriously affected by dry weather. Tubers medium to large, ovate to oblong in shape; eyes broad, near the surface, slightly pink-tinted; lip well marked; skin pinkish white, thin, coarsely netted; flesh cream white, firm, fine grained, dry. Season late and quite productive. This variety is largely advertised and will be given further trial. Rather tall, medium, spreading.

Endurance.—A late variety that in many localities would not mature. Tubers of medium size, round, oblong; eyes numerous, near the surface; skin slightly rusty, cream white, thin; flesh very white, fine grained, firm, but a little watery. Rather tall, upright. It is a well formed potato and if sufficiently productive will be desirable as a late keeping variety.

Good Times.—Closely resembles *Champion of the World.* The potatoes are medium to large in size; shape oval, slightly flattened; eyes broad, very shallow, slightly lipped and of a delicate pink color; skin finely netted, very thin and pinkish white; flesh firm, of good texture, white and dry. Rather tall, upright, somewhat spreading. A medium late sort that appears to be quite productive. This promises to be a valuable, general purpose potato, as it possesses many points of merit.

Harrington Peer.—A variety that exceeded all others in productiveness. Tubers medium to large, oblong, flattened; eyes numerous, broad and shallow, with a sharp but not prominent lip; skin light pink or rose color, smooth and slightly netted; flesh white, fine grained, firm and dry. It is said to be a seedling of Early Rose, and will take its place on the market, being equal to it in appearance, quality, etc., and promises to be a better yielder. Vines strong, quite tall and upright.

Honeoye Rose.—A fairly productive medium early variety, which possesses points that will make it one of the leaders in the Rose class. The potatoes are of good size, desirable in form and high quality. Stems of medium height, upright, green.

Irish Mignon.—Tubers small to medium, round; eyes slightly sunken, narrow and small, pink tinted; skin cream color, thickly covered with russet; flesh creamy white, firm and dry. Vines of medium height, slender, spreading. Season very late; fairly productive. For growers who prefer a round potato this seems to be a promising late sort.

Joseph.—Originated by the introducer of the old variety *Polaris*. It equals it in quality and excels it in yield. The vines are strong growers; tubers medium to large, slightly flattened; eyes prominent, deeply indented and with a strong lip; skin cream white with slight russet patches; flesh white, firm, of fine texture. Rather tall, spreading. Season medium; fairly productive. Admirers of *Polaris* should add this sort to their list.

Kansas.—A variety strongly resembling Ohio, but it is more productive and matures about two weeks later. Tubers large, irregular, round oblong in shape; eyes numerous, evenly distributed, rather deep and with a purple tint; skin fine russet, rather thick; flesh firm, creamy white, a little coarse, rather watery. Stems green, spreading, medium height. Season medium early and quite productive.

Klondyke.—A white potato worthy of trial. Size medium to large; oblong flattened; eyes shallow, narrow and scattering; skin cream white, slightly russet, finely netted; flesh very white, firm, fine and dry. Season medium. It was one of the largest yielders and this with its other valuable characteristics should make it one of the leading varieties.

Leonard.—Quite productive and a little earlier then Rural New Yorker No. 2, which it resembles in appearance, except that it is less flattened. Tubers of medium size, oblong, slightly flattened; eyes shallow, with a rather indistinct lip; skin pinkish white, finely netted; flesh white, firm, of medium grain, dry. Vines spreading, medium height. Its only superiority over the Rural is that it is less apt to be hollow. It is medium early and appears lacking in productiveness.

Lincoln.— The original seed of this potato was brought from Norway, where it was considered one of the best varieties. It seems to have lost none of its good qualities. The tubers are of medium size, oblong, flattened, with small, rather deeply sunken eyes; lip sharp and well marked; skin white with faint pink patches scattered irregularly over the surface; flesh white, of fine texture, firm but a little watery, which would probably disappear later in the season. Season medium, quite productive. Stems tall, nearly upright.

Long Keeper.—Vines very strong, rank growers; tubers small to medium, irregular in shape, the majority being round to oval and flattened; eyes numerous, very red, situated mostly at the seed end, broad and rather deep; skin covered with many dots, cream white; flesh white, firm, fine grained. Quite late and productive. Strong, tall, rather spreading. Judging from its firmness it promises to be true to its name as a keeper.

Mills' Banner.—Similar to *Livingston's Banner* and possesses qualities that make it an acquisition to a potato grower's list. Season late and one of the most productive varieties grown. Rather long, spreading vines.

Mills' Prize.—Shows no superiority over *Prize* grown here for the past two years. Quite late and fairly productive. The tubers are of good size, of desirable form and excellent in quality.

Onward.—A new variety which resembles *Great Divide* in color, shape and time of ripening. The tubers are of medium size, oval to oblong in shape; eyes small, shallow, cream white; lip distinct; skin smooth with finely netted spots, a delicate white cream color; flesh firm, fine grained, white, rather watery. Stems of medium height, spreading. Owing to its smoothness and other desirable qualities, it is likely to become one of the standard late sorts.

Paddleford.—A new late variety originated at Paddleford, N. Y. Tubers rather small, ovate to oblong in shape, with small eyes; skin pinkish white; flesh dry, brittle, fine grained, firm and white. Stems tall, strong and upright. It seems to have the essentials of a good potato, and is fairly productive.

Perfection.—A medium variety that, owing to its productiveness and fine appearance, together with its superior quality, is bound to be a valuable general purpose sort. Tubers large, oblong, slightly flattened; eyes prominent, but near the surface, slightly pink tinted; skin cream white with traces of pink coloring; flesh very white, of fine texture, dry. Fairly productive. Rather long spreading vines.

Planet, Jr.—One of the largest yielders among the recent introductions. Tubers medium to large, oblong, slightly flattened; eyes numerous, slightly raised and evenly distributed over the surface; skin finely netted, delicately pink tinted; flesh white, fine grained, firm and dry. Very few late varieties promise to be superior to this. Vines medium length, low and spreading.

Pride of Seneca.—A potato with many strong points. Medium to large in size, oblong, flattened; eyes numerous, slightly raised, broad, very strong, slightly pink in the center; skin netted, reddish-pink; flesh very firm, fine grained and dry. Season medium; fairly productive. Stem of medium length and size, spreading.

Queen of the Valley.—A variety so closely resembling *Maggie Murphy* that it is difficult to distinguish them. In fact, *Maggie Murphy*, as grown here, produced tubers that seemed identical with *Queen of the Valley.* Vines tall and strong. Both are valuable sorts, being, as a rule, productive and of fair quality.

Read's Ninety-nine.—An attractive white potato of medium size, oblong, slightly flattened; eyes broad, shallow, very pink; skin cream white, smooth, with slight russet markings; flesh firm, white, fine grained, and dry. It seems to be productive and of excellent quality.

Rose of Erin.—Largely advertised as a desirable general purpose potato. Tubers medium to large, oblong to ovate, flattened; eyes numerous, evenly distributed, narrow and deeply sunken, partly closed with a prominent lip; skin finely netted, pink, very thin; flesh white, rather coarse, but firm and dry. Vines of medium length, spreading. Season medium; rather low in productiveness.

Seedling No. 2. (Teeter.)—A new variety of handsome appearance but lacking in productiveness. Of large size, oblong, flattened in form; eyes shallow, scattering, broad and very strong; skin pure white, finely netted; flesh white, firm texture and very dry. Vines of medium length, low and spreading.

Sir Walter Raleigh.—A seedling of *Rural New Yorker*, which promises to excel its parent, as it seems to be firmer, and less liable to become hollow. Rather tall and upright. The size and shape are very desirable, its quality excellent, and it will take its place on the market as a medium late white potato.

Six Weeks. (Smith.)—A medium early sort of good quality, somewhat resembling Hebron. It is productive on trial as a garden or field variety. Vines of medium height, spreading, green.

Snowball.—A medium early variety, which possesses some very desirable qualities, but it is rather small and appears to be slightly watery.

Stems low, green and spreading. The tubers are very attractive and it will be grown again next year.

Suffolk Beauty.—One of the Rose class. Medium in size, of irregular, oblong shape with numerous deep pink eyes; skin pink, finely netted and filled with small, light dots; flesh pure white with slight traces of pink veins running through it. Season medium; fairly productive. Vines of medium height, spreading.

Trumbull.—A medium early sort that is of fine quality though hardly up to the standard in productiveness. The tubers are of medium size, oblong, flattened, with shallow, open eyes; skin clear white, a little netted, and the surface speckled with numerous small white dots. The texture and flavor are of high quality. Vines of medium height, spreading, green.

Uncle Sam.—One of the white varieties introduced in 1896. It is of excellent quality and of handsome appearance; although not satisfactory in productiveness last year, it has made a good showing the present season. Vines strong, vigorous, spreading.

Woodhull.—One of the varieties that was planted at different dates proved itself to be a very valuable medium early sort. Tubers white, of fine shape, excellent quality and quite productive. Rather tall, green, spreading stems.

White Peach Blow.—A seedling of the *Excelsior*, closely resembling the old *Peach Blow*, but being earlier in ripening, it is even more desirable. The skin and flesh are of floury whiteness; eyes strong, broad. of medium depth. It is a very strong, upright, rank grower with large pink blossoms and may take the place once held by *Peach Blow.*

STRAWBERRIES.

L. R. TAFT AND H. P. GLADDEN.

The season of 1896 was very favorable for plant growth and most varieties were in good condition to bear a large crop of fruit last spring. The season of 1897 was two weeks later than that of the previous year, and the plants which had been held back by the cold spells came into bloom very quickly, and so many blossoms came out that the plants were not able to produce sufficient pollen to properly fertilize all the fruits. Many staminate sorts appeared almost imperfect in flower. Doubtless, the small crop borne by some sorts and the great number of imperfect berries was due to the excessive blossoming. The difference between the time of ripening of the early and late sorts was not so great as usual. When the season opened all varieties came on together.

The table (page 312) was compiled from plants set in 1896. Each variety was given forty feet of space in the row; in one-half of this distance the plants were grown in hills (thirteen); in the other portion the plants were allowed to form a matted row. In nearly every case the largest yield was obtained from the matted rows.

The following sorts fruited here for the first time during the past season:

Anna Kennedy.—Received from J. T. Lovett Co., Little Silver, N. J. Imperfect flower. The variety is fairly vigorous in plant growth, with bright, healthy foliage. The berries are of good size, very regular in form and they have a bright, glossy appearance that makes them attractive for market. In quality it ranks high and seems to possess the necessary firmness to hold up well. The plants retain their vigor to close of season and the last fruits are of good size and form. Were the variety more productive it would find a place as one of the better sorts for market or home use.

Annie Laurie.—From Matthew Crawford, Cuyahoga Falls, Ohio. Perfect flower. The plants are of low, stocky growth, and seem somewhat subject to blight. The berries are usually large, round conical in form and of a bright, glossy scarlet color. In quality and firmness of fruit the variety ranks very high, but seems to lack the plant qualities necessary to produce a large crop of berries.

STRAWBERRIES—TABLE OF VARIETIES.

ABBREVIATIONS.

Form.		Size.	Sex.	Color.	
b broad.	l long.	s small.	p pistillate or imperfect.	b bright.	l light.
c conical.	o oval.	m medium.	b bisexual or perfect.	c crimson.	r red.
d depressed.	r round.	l large.		d dark.	s scarlet.
i irregular.					

Variety.	Sex.	Vigor (1 to 10.)	Date of bloom.	First ripe fruits.	Last fruits.	Productiveness.	Size.	Form.	Color.	Quality.	Firmness.
Acme	b	9.8	May 28	June 18	June 25	7	s	r c	l s	9	8
Allen No. 3	p b	8.8	" 23	" 19	" 25	8	l	r c	b c	9	8.5
Anna Kennedy	p	9.2	" 24	" 19	" 25	8.5	m to l	r c	b s	9	9
Annie Laurie	b	9	" 25	" 20	" 30	7	m to l	r c	b s	9.8	9.5
Apache	b p	10	" 19	" 14	July 5	9.2	m	l c	l s	5	8
Aroma	b	9.4	" 22	" 18	" 5	8.4	l	l c	l s	8	9.5
Arrow	p	9	" 18	" 14	" 2	9.3	m to l	l c	v d c	9.5	8.5
Beauty	b	8.5	" 22	" 16	June 30	9	l	r b c	b d s	8.5	8
Beder Wood	b	8.5	" 17	" 12	" 30	9	m	r	l c	8	8.5
Beebe	p	8.2	" 19	" 17	" 30	7	m to l	r c	c	9	8.5
Belle	b	8.8	" 22	" 20	" 25	7	m to l	l c	b s	8	9
Belle of Lacrosse	p	7	" 23	" 17	" 25	8	l	r b c	b d s	8	8
Bird	p	9.3	" 23	" 17	" 30	9	l	l c	b d s	9	9.2
Bisel	b	9	" 19	" 17	" 30	8.5	m	l b	b c	9	9
Bixler	b	9.2	" 21	" 16	" 25	7	s to m	r d c	l s	9.5	8.5
Blonde	b	9	" 25	" 19	" 30	7	m	r c	l r	8	7.5
Bostonian	b	9.3	" 24	" 18	" 30	6.5	m to l	r c	b s	9.8	9
Bouncer	b	8	" 22	" 19	" 25	5	m	l c	v d c	8	8.5
Brandywine	b	9.6	" 22	" 19	July 5	8.2	l	r c	b d c	9.5	8.5
Brooke	p	8.5	" 25	" 19	June 29	8	l	b d c	d c	9.5	8.5
Brunette	b	9.4	" 24	" 19	" 30	8.5	l	r c	d c	9.8	9
Bubach	p	9.6	" 24	" 19	" 30	8.5	l	d c	l c	9	8
Champion	b	8.2	" 19	" 19	July 2	8	l	l c	d s	8	7
Charlie	p	9.3	" 21	" 17	" 2	8.5	m	l c	b d s	9	8.8
Cherokee	b	9.5	" 19	" 15	June 30	8.5	m	r c	c	9	8.5
Childs	b	8	" 17	" 14	" 29	8	l	d c	b c	9.5	9
Clyde	b	9.5	" 17	" 12	" 25	8.5	l	r c	l s	9	8.5
Columbian	b	9.2	" 21	" 17	" 25	8.5	l	r c	b s	8.5	8.5
Cruse No. 9	p	5	" 23	" 21	" 28	6	m	r c	l r	7	7
Cyclone	b	9	" 17	" 16	" 25	8.5	m	l c	d c	9	9
Dakota	b	9.2	" 22	" 17	" 30	9	m to l	l c	b s	9	7
Dictator	p	8	" 17	" 12	" 30	8	m	r c	r	7.5	8.5
Earliest	b	9.5	" 15	" 14	" 25	6	m to l	r c	l s	7.5	7
Early Bird	b	8	" 21	" 16	" 25	7	s	i	l c	7.5	8
Early Jack	b	9	" 16	" 12	" 28	6	s to m	i	b s	7	7
Edith	p	7.5	" 29	" 22	July 5	7	m	l b c	d c	9	9.5
Edward Favorite	b	4	" 22	" 19	June 25	2	l	r c	b d c	9.4	9
Enormous	p	9.2	" 25	" 19	July 2	9	l	i	d c	9	9
Epping	p	9.4	" 24	" 15	June 29	8	l	r d c	l s	8	9
Equinox	b	8	" 21	" 19	July 2	7	s	d c	c	8	8.5
Eureka	p	9.6	" 22	" 17	" 5	9.2	l	r c	d c	7	8
Farmington	b	8.8	" 23	" 16	June 30	8.8	l	r c	d s	9.4	9
Fremont	b	9.8	" 21	" 19	" 30	9.5	m to l	l c	b s	9	8.8
Gandy	b	9	" 25	" 21	July 5	8	l	b c	l c	8.5	8.5
Gen. Fifer	b p	8.8	" 22	" 18	" 2	8.5	m	r c	b r	9	9
Gertrude	b	9	" 17	" 15	June 25	5	l	b c	l s	8	8.5
Giant	b	8.8	" 18	" 12	July 2	8.5	l	r c	b c	9.8	9.5
Glen Mary	b	8.5	" 20	" 16	June 30	8.5	l	c	b s	9	9
Graham	b	7.8	" 24	" 19	" 25	6	s	r c	d c	9.2	8
Granville	b	8.8	" 21	" 18	July 5	7	l	r d c	d c	9	8

STRAWBERRIES.—CONTINUED.

Variety.	Sex.	Vigor (1 to 10).	Date of bloom.	First ripe fruits.	Last fruits.	Productiveness.	Size.	Form.	Color.	Quality.	Firmness.
Greenville	p	9.4	May 22	June 18	June 30	8.5	l	r d c	b c	8.5	7.5
Haverland	p	9.7	" 24	" 17	" 29	9	m	l c	s	8.5	8.5
Hayes	p	5	" 24	" 17	" 29	5	m	d c	d c	8	8.5
Hersey	b	8.8	" 20	" 16	" 25	7	m	r c	c	8.5	8.5
Holland	p	9	" 23	" 18	" 30	7	m	l b c	d c	9	9
Homestead	b	8.5	" 22	" 17	" 30	5	s	i	r c	9.8	7
Hull No. 3	b	8.2	" 23	" 20	" 25	6	l	d c	l s	9	7
Huntsman	b	8.8	" 21	" 12	" 25	7	m	r c	l c	8	8.5
Ideal	b	9	" 22	" 17	" 25	8.5	m to l	r c	b c	9	9
Iowa Beauty	b	9.2	" 22	" 15	" 30	8	m	r c	d c	9.5	8.5
Jarbalo	p	9.1	" 22	" 17	" 29	8	m to l	r c	d c	7.5	8.5
Jay Gould	p	9.2	" 22	" 17	" 25	7.5	m	r c	b c	9.2	9
Jerry Rusk	b	8	" 21	" 18	" 30	8.5	m	r c	b s	9	9
Judsonia	b	8.5	" 20	" 16	" 29	6	l	r b c	l c	7.5	7
Kansas	b	9.1	" 23	" 18	" 30	9.2	m	r c	d c	9.5	8.5
Karl	b	9.8	" 21	" 20	" 30	5	s	i	d c	6	6
Klickita	p	6	" 21	" 18	July 2	6	l	r d c	d s	9	7.5
Kossuth	b	9.2	" 22	" 17	June 28	7	l	r b c	d c	9.2	9
Kyle No. 1	b	9.8	" 23	" 18	July 5	9	m	r c	l s	6	6
Lanah	b	9	" 24	" 18	" 2	6	s to m	c	l s	8	9
Leader	b	9	" 21	" 18	June 30	8	m to l	l c	v d c	9	9
Leroy	p	9.8	" 21	" 19	" 30	9.5	l	d c	d c	9	9
Long John	b	9	" 16	" 15	" 30	7	l	v l c	b c	9	8.5
Lovett	b	9	" 21	" 18	" 25	8.5	m	r c	b c	8	9
Margaret	b	6	" 25	" 20	" 25	5	l	i	b s	9.5	8
Marshall	b	8.2	" 23	" 18	" 25	8	l	r c	d c	8.5	9
Marston	p	9.5	" 22	" 17	" 30	9.8	m	r d c	l r	7	8.8
Mary	p	9.1	" 23	" 19	July 5	8.5	l	b d c	b c	7	9
Maxwell	p b	8	" 24	" 18	June 28	6	m	r c	d c	8	9
Mayflower	b	9	" 22	" 19	" 25	------	------	------	------	------	------
Meridian	p	9.2	" 23	" 17	July 2	9	l	r c	d c	7.5	8
Meek	b	9	" 20	" 17	June 25	6	m	r c	l c	8.5	8.8
Mrs. Cleveland	p	9.5	" 22	" 19	" 29	8	m	r b c	b s	8	8
Mystic	b	9.5	" 22	" 19	" 30	8	m to l	r c	b d c	9	8
Nan	b	8	" 24	" 19	" 30	7	s to m	r c	l c	9.2	9
Nim Seedling	p	8	" 22	" 16	" 30	7	l	r c	b s	9.2	7.5
No. 1000	p	8.5	" 24	" 16	" 30	7	l	b c	b d c	9	9
No. 15 W.	b	8.2	" 21	" 19	" 2	8	m to l	r c	l s	8	7
No Name	b	8.8	" 20	" 16	" 25	7.5	l	b c	d c	9	9
Ona	p	8.8	" 25	" 15	" 25	7.5	m to l	r c	b d s	9.8	8.5
Oriole	p	6	" 24	" 18	" 25	------	------	------	------	------	------
Orono	p	7.8	" 22	" 18	" 30	8	s to m	r c	v d c	8.5	9
Ostego	p	9	" 22	" 18	" 29	7.5	m to l	r d c	l s	8	8
Paris King	b	9.3	" 23	" 17	" 25	7	m	c	d s	8.5	8.5
Parker Earle	b	9.1	" 24	" 20	July 5	8.8	m	l c	d s	8	9
Phippen	b	9.7	" 24	" 18	June 30	9	m	l c	b c	8.8	9
Plow City	p	7.5	" 21	" 19	July 2	7	m	l c	b s	9	8.5
Pres. Carnot	b	5	" 23	" 19	June 25	------	------	------	------	------	------
Princess	p	8.8	" 22	" 16	" 25	8	m	r	c	9	8.5
Princeton Chief	p	9.1	" 23	" 19	" 30	8.6	l	l c	d c	8.5	8.8
Portage	b	9.2	" 24	" 20	July 5	9	l	l d c	l s	8	8.5
Purdue	p	8.8	" 24	" 14	June 25	9	m to l	r c	d s	8.5	9
Richmond	b	8.8	" 22	" 19	" 30	7	l	b c	d c	9.5	8.5
Rio	b	9	" 17	" 12	" 25	7.5	m	l c	b s	9	8.5
Robinson	b	9.2	" 23	" 19	" 30	7	m	r c	b c	7	8
Ruby	b	8.8	" 22	" 17	July 5	9	l	r d c	b r	9.5	9.5
Sadie	p	9.4	" 17	" 12	June 28	8	m	r c	d c	9	8
Sensation	b	5	" 23	" 17	" 24	------	------	------	------	------	------
Shawnee	p	9.5	" 20	" 18	July 5	9	m	l c	d c	9	8
Sherman	p	9	" 18	" 16	June 29	9	l	r c	d c	8.5	9

STRAWBERRIES.—CONCLUDED.

Variety.	Sex.	Vigor (1-10).	Date of bloom.	First ripe fruits.	Last fruits.	Productiveness.	Size.	Form.	Color.	Quality.	Firmness.
Smalley	p	8.8	May 20	June 16	June 25	4	m to l	r c	d c	7.5	9.8
Smith	p	9.5	“ 20	“ 14	“ 25	7	s	r c	r	8	8
Snowball	b	8.8	“ 21	“ 17	“ 30	9	l	l c	b s	8.5	9
Sparta	b	9.4	“ 22	“ 17	“ 30	8.5	m to l	l c	d c	9.5	9.5
Splendid	b	8.8	“ 21	“ 17	July 2	8	m	d c	d s	9	9
Springdale	b	9.2	“ 21	“ 18	June 30	8	l	r c	b s	8	8
Stahelin	p	9.8	“ 21	“ 16	“ 30	9.5	l	i c	v d c	9.5	8
Staples	b	8.5	“ 18	“ 15	“ 25	7.5	s	l c	v d c	9	8.5
Stayman	b	9.2	“ 17	“ 16	“ 25	7.5	l	r c	d s	8	8.5
Stewart	b	9.4	“ 19	“ 16	“ 25	7.5	s to m	d c	d c	8	9.2
Sunnyside	p	9	“ 22	“ 16	July 2	9	l	r c	l s	8.5	8
Sunrise	p	8.8	“ 22	“ 15	June 30	9	m	r c	b s	8	9
Surprise	b	6	“ 21	“ 18	“ 30	3	l	l c	b s	8	8.5
Tennessee	b	9.2	“ 20	“ 20	“ 29	8	m to l	r c	d c	9.5	9
Thompson No. 40	p	9.8	“ 25	“ 19	July 5	9.5	m	r c	b c	8.5	8.5
Thompson No. 64	p	8.8	“ 20	“ 16	June 30	8.5	m to l	i r c	b d s	8.5	9
Thompson No. 66	p	9.2	“ 22	“ 15	“ 30	9	l	l c	b d c	8	8
Thompson No. 103	b	8.2	“ 19	“ 16	“ 29	9	l	r d c	v d c	9.4	9.8
Timbrell	p	9.1	“ 21	“ 18	July 5	8.5	l	r c	v d c	9.5	8
Tonga	p	7	“ 22	“ 19	June 25	4	m	i r c	s	8	9
Topeka	b	9.2	“ 23	“ 19	“ 30	8	m to l	l c	d c	8	8.5
Tubbs	b	8	“ 23	“ 15	“ 25	7.5	m	r c	b s	9	6
Warfield	p	9.8	“ 20	“ 15	“ 30	10	m	l c	d c	8.5	9
Weston	p	9.5	“ 24	“ 19	July 5	8	l	b c	b c	8	8.5
Williams	b	9.2	“ 22	“ 16	June 30	8	m to l	r c	d c	9.5	8.5
Wm. Belt	b	7.5	“ 20	“ 19	“ 25	7	l	l c	l c	8.5	9
Woolverton	b	8.8	“ 24	“ 19	“ 25	8	m	l c	d c	8	9
Wyatt	b	8	“ 20	“ 16	“ 25	7	s	r c	d c	9.5	8.5
Yates	b	9.5	“ 22	“ 16	“ 25	5	s	r b c	l s	7	7

Arrow.—From Edward W. Cone, Menomonie, Wis. Imperfect flower. The plants are of strong, healthy growth, set a good crop of fruit and hold out well to close of season. The berries are of large size, long pointed conical in form, very dark crimson in color. The quality is high and the fruit moderately firm. Many of the berries are rather too long and narrow to make the best appearance in the box. The variety promises well in high quality of fruit, productiveness and vigor of plant growth.

Beebe.—From W. F. Allen, Jr., Salisbury, Md. Imperfect flower. Plants are of rather weak growth; those in hills are better than those in matted row. The berries are of good size and color, a little irregular in form and of good quality. The plants are not productive enough, and the variety seems to possess no special points of merit to give it prominence.

Blonde.—From G. Cowing, Muncie, Ind. Perfect flower. Plants are of good growth and healthy in foliage. The berries are of medium size, pointed conical in form, somewhat lacking in quality and rather soft. As the variety is low in productiveness it has little chance for prominence among the many better sorts.

Bostonian.—From New York Experiment Station, Geneva, N. Y. Perfect flower. Plants are of good growth, much more vigorous and healthy in matted row than in hills. Berries medium to large in size, round or flattened conical in form and of a bright scarlet color. The quality is of the best and the fruit is firm. Many of the berries on the truss were small and imperfect and the variety lacks productiveness.

Bouncer.—From W. F. Allen, Jr. Perfect flower. The plants are not of strong growth and make runners very slowly. The berries are of medium size, long conical form and very dark crimson color, having something of the appearance of Timbrell. Many blossoms failed to develop fruits and the variety is so lacking in plant and fruit qualities that it has little show for a place among the promising sorts.

Champion.—From David Strouse, Rogersford, Pa. Perfect flower. Individual plants are fairly vigorous but the variety makes few runners. Somewhat inclined to blight. Berries usually large, flattened, long conical in form, often irregular; color a dark scarlet; the flesh is light colored and a little inclined to be salvy. Quality rather poor and the fruit is soft. In productiveness it is somewhat below medium.

Cherokee.—From John Little, Granton, Ontario. Perfect flower. The plants are of strong growth and healthy. The fruits set well though many berries were imperfectly formed. Berry of medium size, round conical in form and scarlet color; the quality is good and the fruits moderately firm. Its bearing qualities are but medium and too many of the fruits are below marketable size.

Cruse No. 9.—From Stayman and Black, Leavenworth, Kan. Imperfect flower. Plants are rather weak in growth, though foliage is of good color and healthy. Berries are few in number but of good form. The color is too light and the fruits are soft. Further trial is necessary to determine the value of the variety.

Dakota.—From Stayman and Black. Perfect flower. Plants of strong growth and healthy. Berries medium to large in size, long pointed conical form, often with neck; color a bright scarlet. The quality is good though the fruit is rather dry and quite soft when ripe. The truss is long and reclining and the fruits lie on the ground. The variety is productive and excellent in plant qualities. The berry is rather long and slender for best form and too soft to carry well.

Dictator.—From C. A. Gardner, Dimondale, Mich. Imperfect flower. Plants are of but medium growth and seem quite subject to blight. The variety is but moderately productive and has no qualities of plant or fruit to make it especially valuable.

Early Bird.—From Ohio Experiment Station, Wooster, Ohio. Perfect flower. The plants were not of strong growth and the few fruits borne were of small size and imperfect in form. This season's trial was unsatisfactory.

Equinox.—From Thompson Sons, Rio Vista, Va. Perfect flower. Plants are of short, rather weak growth. They set well with fruit but could not mature the crop and the berries were small.

Farmington.—From R. Johnston, Shortsville, N. Y. Perfect flower. Plants are of quite vigorous growth and the foliage healthy. The variety did not blossom very full and there were a number of imperfect fruits, and blossoms that did not set. Berries are of good size and form, the color is attractive and the quality high. Fairly productive of firm fruits that are of high quality. It is well worthy of trial. Does well in hills.

Fremont.—From J. Little. Perfect flower. A strong, healthy grower and a good plant producer. It seems well adapted to hill culture. The berries are of good size, long conical, somewhat angular in form and bright scarlet in color. The flesh is bright, juicy, a little acid, but the quality is good and it is moderately firm. As the variety is strong in plant growth, productive, and the fruit very attractive in appearance, besides having the other qualities that make a good berry, it is a sort of much promise.

Gen. Fifer.—From E. J. Hull, Olyphant, Pa. Perfect flower but weakly so. Plants are of moderate growth and much better in matted row than in the hills. Berries of medium size, short round conical form and color a bright red. The flesh is bright, juicy, good quality and firm. The truss is upright and many of the fruits are borne above the plants and exposed to the sun. Many fruits were abortive and imperfect, and the plants seem quite subject to blight.

Gertrude.—From Slaymaker & Son, Dover, Del. Perfect flower. Plants are strong and healthy in both hills and matted row. But few berries borne, and the majority of them are small and imperfect. Unsatisfactory from this season's trial.

Giant.—From W. F. Allen, Jr. Perfect flower. The variety is not a good plant maker, though the individuals are vigorous and quite free from blight. The plants are doing better in the hills than in the matted row. Berries are large in size, round conical and regular in form and bright crimson in color. The fruit is very attractive in appearance, of high quality and firm. Were the plants more productive and of better growth, it would be a valuable sort.

Glen Mary.—From W. F. Allen, Jr. Perfect flower. The plants were set late the previous season and did not get a good start. The variety does not seem a strong plant maker though some plants are vigorous and the foliage is healthy. Berries are large, slightly angular, and even irregular in shape; color even, though not very attractive in appearance. The quality is good and the fruit firm. Requires further trial under more favorable conditions to test its merits here. Those in search of large fruits of good quality that are firm and look well should try this sort.

Granville.—Ohio Experiment Station. Perfect flower. Plant fairly vigorous and healthy but seems to be a poor runner maker. Some of the berries are very large, round or flattened conical in form and dark crimson in color. The quality is good but the flesh is mealy. While the variety bears some fruits that are very large, many are below the average in size and unsalable.

Hayes (*Prolific*).—From Rogers Nursery Co., Moorestown, N. J. Flower imperfect. Unsatisfactory in plant and fruit.

Homestead.—From Edward W. Cone. Perfect flower. Plants are of low growth, not very strong but the foliage is healthy. Berries are small and imperfectly formed. An occasional fruit is of medium size, round conical form, very dark crimson color and of high quality though soft. Lacks productiveness and size of fruits.

Ideal.—From M. Crawford. Perfect flower. The plants were set late in the season. They are of low, stocky growth and the foliage is healthy. Few blossoms appeared but nearly every flower developed a good berry. Berries of good size, round conical, usually sharply pointed in form and of a bright crimson color. The flesh is dark, juicy, of good quality and firm. The variety is excellent in plant qualities and the fruit very handsome in appearance and possessing high quality and firmness. Its future has much of promise.

Jerry Rusk.—From Ran Benoy, Matthews, Ind. Perfect flower. Plants of low, rather slender growth with considerable blight showing on foliage. Berries are of medium size, bright dark scarlet color, round or flattened conical in form, often quite irregular. The fruits are of high quality and firm. Too many fruits set for the strength of plant and many were very small and imperfect. If more vigorous and healthy in plant, it would be a valuable sort.

Karl.—From Fred Stahelin, Bridgman, Mich. Perfect flower. Plants of very vigorous growth, as strong as any in the plot. The variety blossomed very full but many trusses failed to set a single fruit. The few berries borne were small, imperfect, lacking in quality and soft. Further trial is necessary.

Lanah.—From Ohio Experiment Station. Perfect flower. Plants are of vigorous growth and the foliage is healthy. The plants blossomed full but set few fruits and those are mostly small and imperfect. The berries ripen evenly and are firm. Further trial is necessary.

Marguerite.—From J. C. Grossman, Wolcottville, Ind. Perfect flower. Plants are of moderate growth, rather stocky, foliage is dark green and very healthy. The plants were set late and in rather a poor location. A few berries are large in size, flattened irregular form and a bright scarlet color. The flesh is bright, of high quality though rather soft. Under more favorable conditions the variety might prove valuable for home use.

Margaret.—From M. Crawford. Seems to be identical with above.

Marston.—From New York Experiment Station. Imperfect flower. Plants are of vigorous growth though the foliage is showing some blight. Berries are of medium size, round depressed conical in form, color a light red. The flesh is light in color, juicy and quite acid in quality, moderately firm. Much like Crescent in plant and fruit.

Nan.—From New York Experiment Station. Perfect flower. Plants of low, stocky growth and foliage healthy. But few fruits grew well, most of them being small and imperfect. A few berries were of large size, round or flattened conical form and a bright crimson color. The quality is good and the fruits firm. The variety lacks the plant qualities to set and develop a crop of fruit.

No. 1000.—From M. Crawford. Imperfect flower. The plants are of good growth and healthy, though set late and in a poor location. The truss is reclining and the fruits lie on the ground. Berries large, round conical, bright dark crimson color, very handsome in appearance, and the flesh is dark, juicy, firm and rich in flavor. Excellent in plant and fruit and, if more productive under favorable conditions, it will be a valuable sort for home use or market.

No. 15, W.—From Edw. W. Cone. Perfect flower. Plants are of low stocky growth, quite strong and healthy and much better in hills than in the matted row. Berries medium to large in size, short, round conical form; color a light scarlet. The flesh is light in color; lacks juice and quality and becomes quite soft when ripe. Nothing to give the variety special prominence.

Phippen.—From J. Little. Perfect flower. Plants of strong growth. Foliage is a light yellowish green, with leaflets long and narrow, and inclined to roll and turn yellow on edges. Plants in matted row are much better than those in hills. The truss is long and reclining and the fruits are borne on the ground. Berries are of medium size, long conical form;

color a bright scarlet. The flesh is bright, firm, juicy, rather acid but the quality is good. The habit and growth of the plant are poor and the berries are not large enough for a leading variety.

Plow City.—From Slaymaker & Son. Imperfect flower. The plants were set late and did not get a good start and were not strong enough to mature the fruits that set. The plants appear healthy and probably under better conditions would be much stronger. Berries of medium size, long pointed conical and a bright scarlet color. The flesh is juicy, bright, of good quality and firm. Requires further trial.

Portage.—From Ohio Experiment Station. Flowers perfect. Plants of vigorous growth and healthy. Not so good in hills. Berries very large, long flattened conical form; light scarlet color. The fruits are often hollow and have a hard core; flesh dry and mealy. The variety is strong and healthy in plant and productive of very large fruits that are low in quality, but as the berries are attractive in appearance it has a place as a show berry and for market.

Purdue.—From Indiana Experiment Station, Lafayette, Ind. Imperfect flower. Plants were set late and in a poor location, but made a good growth and the foliage was healthy. Berries of medium size, round or flattened conical, with apex depressed; color a dull scarlet. Flesh is dark, firm, juicy, quite acid in flavor but good. The fruit set well and held out to close of season. A promising sort but it requires further trial.

Ruby.—From Ohio Experiment Station. Perfect flower. Plants are not of very large growth but are vigorous and the foliage is healthy. Berries large, flattened conical, very regular and even in form; color is rich, dark, glossy red. Flesh a rich color, and juicy, firm and of best quality. The variety is excellent in plant, the berries are large, very handsome in appearance, and as the quality is very high and the fruits are sufficiently firm to stand shipment well it is a most promising sort.

Smith (Seedling).—From Slaymaker & Son. Imperfect flower. Plants of good growth and have healthy foliage. The variety blossomed full but few fruits set and they were small round conical, light red color and medium in quality and firmness. Further trial necessary.

Sparta.—From M. Crawford. Perfect flower. Plants of strong growth and very healthy in foliage. Berries medium to large size, rather long conical in form, usually with a neck; color dark crimson. The flesh is firm, of a rich color and high quality. It was grown in a poor location, but if under more favorable circumstances the plants prove more productive the variety will be valuable.

Sunrise.—From W. F. Allen, Jr. Imperfect flower. Plants are of fine growth and have healthy foliage. The plants in matted row are doing much better than those in hills. Berries of medium size, short, round conical form and bright scarlet in color. The flesh is dark, juicy, of fair quality and firm. The fruit holds out well in season but the majority of of them are somewhat under size. A variety of some promise.

Tubbs. From W. F. Allen, Jr. Perfect flower. Plants are of medium growth and the foliage is healthy. Berries of medium size, round conical form and a bright scarlet color. The flesh is bright, juicy and has a sprightly flavor, but lacks firmness. It is an excellent sort to eat from the plants and may do for home use, but the berries are much too soft for market.

The following new sorts require another season's trial before a description can be given of them:

Benoy, *Burnett*, *Dollar*, *Erie*. *Hilton Gem*. *Hunn*, *Larton's No. 1*. *Michigan*, *Murray*, *Noble*, *Orange County*, *Premium*. *President Carnot*, *Sensation and Slaymaker No. 10*.

NEW VARIETIES OF 1896.

Acem. While very vigorous and healthy in plant produced but a small crop of berries and those borne were small in size, not of good form and rather soft.

Apache.—The plants were the strongest in growth of any in the field and the foliage was free from disease. A large crop of berries were borne but the form is long and narrow, the color bright and the fruits very poor in quality and soft. The variety will scarcely find a place in any planting.

Brooke.—The fruits are of good quality, firm and very attractive in appearance, but the plants are scarcely strong enough in growth to produce a large crop. The variety holds out well in season.

Bryant.—The variety is excellent in size, color, quality of fruit and in firmness, and the plants were of good growth and healthy. A small crop of fruit was produced, much less than that of last season. It requires further trial for productiveness.

Columbian.—Plants of vigorous and healthy growth. The fruits are of good quality and firm. The variety seems somewhat low in productiveness to become prominent.

Earliest.—This variety was not so early as last season when it ripened several days before any other early sort. The plants are vigorous and healthy but give but one or two pickings and then the crop is gone. Not worthy of general planting as an early sort.

Enormous.—The plants in matted row are much better than those in hills. The hill plants are not strong enough to mature a crop. The fruits are very large, but often quite irregular in form. The quality is high and the berries are firm. The variety has a long season and the plants are productive. This season's trial strengthens our report of last year when it was recommended as a sort of much promise because of productiveness, large size and the good quality and firmness of the berries.

Graham.—Has little in plant or fruit qualities to recommend it.

Holland.—This variety is in a poor location but the plants are vigorous and free from disease. It is but moderately productive and the berries often have a hard core; the quality is good and the flesh firm. If the variety proves more productive under better conditions it will be valuable.

Hull's No. 3.—Proved unsatisfactory this season.

Jarbalo.—The variety is quite vigorous and the foliage healthy. The berries are lacking in attractive appearance and in quality. As the sort is but moderately productive it has no qualities to give it special prominence.

Kansas.—Plants are of good growth, though some blight is showing. This year the fruits were much smaller in size than last season. The berries are of high quality and firm and the plants productive. Too many of the fruits were too small to pick, otherwise the variety is a most excellent one. In hills the plants were strong and the fruits much larger in size. Worthy of trial in hill culture.

Kossuth.—Excellent in every way but the plants were not so productive as last season. Well worthy of trial as under other conditions it may prove more productive.

Mary.—The plants are vigorous and healthy. The fruits large, good color and firm, but very sour. The plants are fairly productive and the sort has some promise as a market berry.

Meridian.—Excellent in growth of plant. The variety does well in hills. It is productive and the berries are large, well formed and hold their size to the close of a long season. An excellent market sort if a little firmer. Lacks quality.

Ona.—This variety was not so vigorous in plant growth or so productive as last season. The handsome appearance of the fruit and its high quality still make it a variety worthy of trial.

Orono.—Lacking in plant vigor and productiveness this season, and too many of the fruits were small. Plants did much better in hills than in matted row. Fruits of good quality and firm, but small.

Ostego.—Lacking in productiveness and has no qualities of plant or fruit to give it special prominence.

Paris King.—Plants of good growth and healthy. But a small crop of fruit and too many berries were small and imperfectly formed.

Sherman.—The plants are of good growth, the fruits large, of good color and firm, though sometimes quite imperfectly formed. As the variety is productive it is of some promise as a market berry.

Smalley.—Last season this variety made an excellent showing in productiveness and size of fruits. This year the plants set full of berries but the fruits failed to develop and the plants dried up.

Splendid.—The plants are not of large growth but are strong and healthy. The berries are not large and their appearance is not attractive, but they are of high quality and firm. Scarcely productive enough to bring the sort into prominence as a profitable variety.

Staples.—Unsatisfactory in plant growth. Unproductive and the berries small.

Thompson No. 103.—While the plants are not of very strong growth the foliage is free from disease. The berries are large, of good color, high quality and firm. Often the fruits do not ripen well on the under side. The variety is quite productive and as the berries present a very attractive appearance and possess the firmness necessary, it promises well as a market sort.

Wyatt.—The berries are of high quality, otherwise the variety was very unsatisfactory this season. Further trial is necessary as ast year's report was quite favorable.

Yates.—Plants of vigorous, healthy growth, but the crop was small and the berries under size, poor in quality and soft.

Some of the following are old and well known sorts that have been tested for years—all have been tested for at least three seasons:

Aroma.—The plants are strong and healthy. The berries are large, regular in form, of fine appearance and good quality. The season is late and well extended and the last fruits are large. Well worthy of planting for a late berry.

Bird.—Is strong and healthy in plant growth, the berries are large, attractive in appearance, of high quality and the flesh is firm. It has borne a large crop of fruit every season and seems deserving of a high place as a market sort.

Beder Wood.—Has long been recognized as a valuable fertilizer for pistillate varieties. The berries are light colored and rather soft.

Bisel.—Is good in plant growth and fairly productive. The fruits are of fine appearance, good quality and firm. Too many of the berries are below size to make the variety a profitable one for the market grower.

Brandywine.—The berries are large, of good form, pleasing appearance, and high in quality. The season is quite late, it holds out for a long time and the last fruits are large.

Brunette. Because of its fine appearance and high quality well deserves a trial in every garden. The berries are of good size and quite firm. The plant is a good grower.

Bubach.—Is a well known sort and one that is largely grown. It is not so productive as Crescent or Warfield but the berries are considerably larger and it is a valuable variety on strong soils.

Charlie.—The plants were much stronger in hills than in matted row and the fruits larger. It is of good growth, berries of good quality and fairly firm. On rich soil, with high culture and grown in hills, this sort would doubtless prove profitable as a market berry.

Clyde.—Last season this was our most productive variety. This spring the plants blossomed very full but the variety does not root deeply and the plants could not mature the large crop of fruit that set. The foliage dried up and many plants were entirely killed. Usually a very profitable variety though the berries are rather light in color and not so firm in flesh as desirable.

Crescent.—Is still very largely planted. The berries are not large, the quality is poor and its appearance is not attractive, but it is one of the most productive sorts grown under usual conditions of treatment. It would seem that some of the larger fruiting sorts that are better in quality and appearance could profitably take its place.

Eureka.—This variety is a strong grower and productive. The berries are large but are not of very high quality and but moderately firm. The season of ripening is a long one and the berries are uniformly large. It is well worthy a place as a late berry.

Gandy.—This variety has been largely planted as a late market berry. The fruits are large but not enough of them are borne.

Greenville and *Weston.*—Are excellent in plant growth and fairly productive of good sized fruits. In quality and firmness the berries are medium. Both sorts are attractive in appearance and well worthy of trial for market.

Haverland.—This variety, though scarcely so productive as Warfield, has fruits that are much better in quality and larger in size than that sort. Taking productiveness, size and quality together, no variety ranks much higher than Haverland for home use or local market.

Leroy.—This variety has been grown here since 1893. The plants have been strong and healthy in growth and uniformly productive of large crops of berries. The fruits are large, fine color, regular in form, of high quality and firm. It should be given a trial as a market sort.

Marshall.—The berries are large and uniform in size, of good quality and firm. The plants are of medium growth and somewhat subject to rust. Many report this variety as one of the best for large sized fruits and for productiveness. It has not shown any remarkable qualities in plant or fruit here, but is a sort that should be tried by anyone in search of a variety bearing large berries that are of good quality and firm, for use on strong soils. The fruit is rather dark and the foliage is subject to rust.

Mrs. Cleveland, *Princeton Chief* and *Topeka* are good in plant growth and fairly productive of berries that are good in quality but scarcely firm enough to stand shipment well.

Parker Earle on strong soil and with plenty of moisture is a most valuable late market sort. Under other conditions the plant sets more fruits than it can mature.

Shawnee.—Berries of large size, dark rich color and of high quality. The plants set a large crop but the last fruits were small. Season rather late. Fruits ripen somewhat unevenly.

Snowball.—This season the plants were not so strong in growth as they have formerly been. The berries are very handsome in appearance, of good quality and firm. If the growth of plant is good the variety is very promising for market.

Stahelin.—The plants are of strong, healthy growth and productive. The berries are large, of very fine appearance and high quality. For near market or home use this is a most excellent sort.

Thompson No. 40.—This is another sort that has been tried for several years and with best results. Very strong and healthy in plant and very productive. If the berries were larger in size this variety would be one of the best grown.

Thompson No. 66.—The fruits are larger than No. 40 but the variety is not so productive. Has shown up well for the several seasons tried but has no extraordinary qualities.

Timbrell.—Though but moderately productive and the fruits have a mottled appearance that makes them unattractive, the high quality of the berries and their large size make this a valuable sort for home use.

Warfield.—Taking all points into consideration, it is doubtful if there is a more profitable variety for the general planter than the Warfield. In productiveness and appearance it ranks very high. If the size of the fruits could be increased and the quality improved it would be the ideal berry.

Epping, *Huntsman* and *Iowa Beauty*, while possessing excellent qualities of plant and fruit, are not productive enough to become profitable sorts.

No Name produces too many small fruits.

Maxwell, *Rio* and *Wm. Belt* have in previous seasons made a good showing. This year they were unsatisfactory in plant and fruit.

SUMMARY OF VARIETIES.

The most promising of the new sorts, taking all points into consideration, are Arrow, Farmington, Fremont, Glen Mary, Ideal, Marston, Purdue and Ruby.

Of the varieties that have been tested two seasons the following have the most promise: Enormous, Kansas, Mary, Meridian, Ona, Sherman and Thompson 103.

It is doubtful if there are more profitable varieties for the market grower than Bubach, Crescent, Haverland, Warfield, and on strong soil the Parker Earle. Bubach is not very productive and Crescent is poor in quality and often undersized. Beder Wood and Sharpless are good fertilizers for these imperfect kinds. Clyde is an early bloomer, with abundant pollen and should be tried as a fertilizer. Woolverton is also good.

Among sorts not so widely known as the above but which have given excellent results as market berries are Bird, Charlie, Greenville, Leroy, Snowball and Weston.

For the grower in search of varieties that will bear large fruits and that are fairly productive, Brandywine and Marshall are recommended.

Aroma and Eureka bear large fruits, ripen late and have a long season. They are well worthy of trial as late varieties.

Brunette and Timbrell are large fruiting kinds that are very high in quality. They are recommended for home use.

SPRAYING CALENDAR FOR 1898.

BY L. R. TAFT.

There seems to be each year an increase in the number of insects and diseases by which fruit and other plants are affected, and it is fortunate that for most of them we have at hand remedies that are effective and that can be cheaply applied. While in some cases and in certain seasons spraying is not actually a necessity, it will seldom be found that spraying to some extent cannot be done with profit. In many cases it happens that one preparation will be effectual against a number of insects or diseases, and we are often able to combine and apply at one time remedies against both insects and diseases. This greatly lessens the expense of spraying.

In order to be most effectual, the remedies against insects should be applied when they first appear, as if allowed to make their full growth they are much more difficult to kill, and in the meantime may do much harm. This is of even greater importance with fungous diseases, as they work for the most part within the soft portions of the plants, and the remedies must be used as preventives if at all. Thoroughness must also be insisted upon, as, if any portions of the plants are not properly sprayed, the insects that feed there will not be destroyed, and the spores of the various fungi will readily gain entrance.

Particularly in spraying large trees large and powerful pumps should be used.. They will make it possible to reach all parts of the trees. The Vermorel, Bordeaux, McGowan and other nozzles form a fine, mist-like spray, and not only aid in the distribution of the spraying material, but do so in an economical manner.

SPRAYING CALENDAR.

For all fruits subject to the attack of fungous diseases, the application of a spray of strong copper sulphate solution (one pound in from fifteen to twenty-five gallons of water) early in the spring before the buds open, is desirable, as it will destroy the spores that have passed the winter upon the trees. This application is sometimes omitted and the first spraying is with Bordeaux mixture, after the growth has started, but before the flower buds have opened. One of the above can generally be used with profit, and both will repay the expense if fungous diseases have been troublesome the previous year. As soon as the petals have fallen from the flowers, they should again be sprayed with Bordeaux mixture to which three or four ounces of Paris green, or other arsenite, have been added for each fifty gallons. The arsenites destroy any leaf-eating insects that may appear, and should be used on the first appearance of canker-worms, slugs, tent-caterpillars and similar insects. If applied within a week after the petals have fallen, it will also aid in controlling the codlin moth and plum curculio. At the end of two or three weeks the application of Bordeaux mixture and an arsenite should be repeated, and, as occasion demands, judging from the appearance of insects and diseases, and if the conditions are favorable for the development of the latter, the trees should be sprayed. Several of our fruits are attacked by fungous diseases during the months of July and August, and, in case the fruit has been gathered, or will not ripen until fall, Bordeaux mixture can be used as a fungicide, but otherwise a solution of copper sulphate, or of liver of sulphur, should be applied. For the powdery mildews fully as good results, if not better, are obtained from the use of liver of sulphur as from Bordeaux mixture, but the latter is generally preferable for other diseases as it will remain for a longer time upon the foliage.

For borers near the collar of fruit trees, the use of various alkaline washes is desirable, as they keep the bark smooth and the eggs are not likely to be deposited. The addition of Paris green, lime, sulphur and carbolic acid, is recommended by some. If the borers have entered the trunk of the trees they should be carefully dug out.

Apples and Pears.—The treatment recommended above will generally suffice for ordinary insects and diseases, but the pear is often attacked by leaf-blight, for which one or two applications of Bordeaux mixture in July and August will prove effectual. For the pear blight the injured portions should be cut off several inches below where the disease appears. The pruning knife and saw should be dipped in some disinfecting solution, such as corrosive sublimate, before it is used on other trees; this is also a good plan when pruning pear trees at any time.

Plums and Cherries.—For brown rot, shot-hole fungus, slugs and curculio, spray with Bordeaux mixture and an arsenite. Cut out and burn "black knot". Examine the trees for it in June and again in early winter. Fungicides help to prevent its spread. For plant lice, or aphides, spray thoroughly with strong tobacco water.

Peach.—Spray with Bordeaux mixture just before the buds open, for curl leaf and brown rot. Repeat as above, adding an arsenite. When yellows appears, immediately cut out and burn the trees. Examine for borers in October and May. Dip roots of young trees in tobacco water for black peach aphis, before planting; on the roots of orchard trees apply wood ashes. Reject nursery trees with crown-gall.

Grape.—Use Bordeaux mixture and arsenites thoroughly for mildews, black rot and anthracnose, and leaf-eating insects. For mildews, particularly when the fruit is nearly ripe, use liver of sulphur, or copper sulphate solution.

Currants and Gooseberries.—For mildew, leaf spot and worms, spray with Bordeaux mixture and arsenites, when worms first appear; repeat if necessary. After second application rely on liver of sulphur for mildews. After crop is gathered use Bordeaux mixture for leaf spot.

Raspberry and Blackberry.—Dig out plants affected with Orange rust; cut out canes severely injured by anthracnose and spray with Bordeaux mixture. If the plantation becomes badly diseased start anew, using healthy plants.

Strawberry.—Spray with Bordeaux mixture and arsenites for leaf blight, leaf rollers and others insects, just before the blossoms open, and again after the fruit has set. Repeat after the fruit has been gathered.

Potato.—For the Colorado beetle spray with Paris green (one pound to one hundred gallons) and lime. For the early blight use Bordeaux mixture.

Tomato.—For the tomato worm and tomato rot, spray with Bordeaux mixture and Paris green.

Cucumbers and Squashes.—Apply plaster and Paris green for the striped beetle while dew is on. Trap black bugs under shingles, and spray with gasoline and water (one to eight), mechanically mixed. If mildews and other fungous diseases appear, spray with Bordeaux mixture and liver of sulphur.

REMEDIES.

INSECTICIDES.

For nearly all insects that eat the foliage, or other exposed portions of the trees, some material should be used that will poison them, and for this purpose the arsenites are generally resorted to. Paris green contains, when pure, rather more than fifty per cent of arsenic, and, being but slightly soluble in water, is not injurious to anything except the most tender foliage. This tendency to burn the foliage can be counteracted by the addition of a small amount of lime. The use of lime with Bordeaux mixture is of value also, from the fact that it cements the poison upon the leaves and renders its effect much more lasting. For many of the fruits, and other plants, Paris green can be combined with Bordeaux mixture to good advantage, as the two can be applied at one time, and the lime of the Bordeaux mixture will render the addition of more lime unnecessary. London purple, which is an arsenite of lime, while Paris green is an arsenite of copper, is often used instead of Paris green, but is rather less effective as an insecticide, and, being slightly more soluble, is more likely to injure the foliage. When Paris green costs more than ten cents per pound, in large quantities, white arsenic will be found a cheap and effective substitute for it. As the cost of the two materials is about the same per pound, and, as the Paris green is about one half arsenic, the latter will go twice as far, and hence be but one half as expensive.

The following formula for preparing the above insecticide can be used for all our fruits with safety, and, in case the insects have become numerous and destructive, it would be safe, except on the peach, to increase the amount of poison one half; while against the potato beetle the amount of poison can be doubled.

Paris green (or London purple)........................	1	pound
Lime	5	"
Water	200	gallons

Formula for white arsenic and lime mixture:

White arsenic	1	pound
Lime	10	"
Water	400	gallons

In preparing the lime and arsenic mixture, add two pounds of lime and one pound of white arsenic, to two gallons of hot water, and boil it for at least thirty minutes. This should be added to 400 gallons of water, and eight pounds of lime additional used. Care should be taken to have the lime freshly slaked. We have used this preparation for several years and find it can be used without injuring the foliage, and that it is as effective as twice the quantity of Paris green.

Sal soda is sometimes used to dissolve the arsenic, but it generally adds at least fifty per cent to the cost of the preparation and makes it nearly, if not quite, as expensive as Paris green. With a little extra labor in boiling, the mixture of lime and arsenic alone will be as effectual and fully as safe. For those who care to use the sal soda, the following formula is given:

Arsenic	1 pound
Sal soda	2 "
Water	2 gallons

Boil until the arsenic is dissolved. The above solution added to ten pounds of lime will be sufficient for 400 gallons of spraying mixture. The solution can be kept for any length of time and can be prepared for use as needed. If only fifty gallons are to be used at once, one pint of the solution and two pounds of lime only will be required.

THE ADULTERATION OF PARIS GREEN.

Many of the failures with the use of Paris green have been ascribed to its adulteration, and this will undoubtedly account for a large number of them. While it is not always infallible, any one can test Paris green by adding ammonia water to a small amount, and if pure it will all dissolve, forming a clear, blue liquid. In case, as will often happen, if adulteration has been practiced, a mass of white material remains undissolved, the amount compared with the quantity of Paris green used for the test will show the amount of the adulteration.

WHITE HELLEBORE.

Although Paris green will give as good or better results, many persons use hellebore upon currant and gooseberry bushes, cabbages, etc. The following formula will give good results:

White hellebore	1 oz.
Water	5 gallons

Care should be taken not to use this upon ripe fruit, as hellebore is a poison.

PYRETHRUM, OR BUHACH.

For use upon plants or trees any part of which is soon to be used as food, pyrethrum, or buhach, will be found an effective remedy against both biting and sucking insects. It can be applied in water at the rate of a teaspoonful to the gallon, or as a powder, either at full strength, or with from three to five times its bulk of flour or plaster. It quickly loses its strength, and to be effectual should be fresh, and should be kept in a tin box or glass bottle.

For the sucking insects, which would not be affected by the arsenites, kerosene, either alone, mixed with water, or as an emulsion, may be used.

KEROSENE EMULSION.

Kerosene	1 pt.
Soft soap	1 qt.
Water	6 qts.

Instead of the soft soap, two ounces of hard soap may be used. Heat the soft soap until it becomes liquid, or dissolve the hard soap in a quart of boiling water. Add the kerosene and agitate the mixture, using a force pump, for five minutes, or until a homogeneous, creamy mass is formed. Before using add six quarts of water. This will kill nearly all insects with soft coverings and will not injure any except the more tender plants. For the scale insects the amount of kerosene should be increased. Upon dormant woody plants it may be as strong as one part of kerosene to four of water and upon many of the trees while in leaf it can be as strong as one to six or eight.

KEROSENE AND WATER MECHANICAL MIXTURE.

Owing to the labor of preparing the emulsion various pumps have been made for the application of a spray of kerosene and water in a mechanical mixture. Among the best are those manufactured by the Deming Co., Salem, Ohio.

Not only is the labor required in making an emulsion saved, but it is even more effective as an insecticide and less likely to injure tender foliage. The proportions of kerosene and water are about the same as when emulsified, but the amount of kerosene can be increased for the scale insects. Gasoline can be used in a similar manner.

CLEAR KEROSENE.

Several parties report using kerosene with effective results and without injury to the foliage. If used at all, it should be with great care, and we caution against its use upon the peach in particular.

Just before the buds open in the spring the bark is well filled with sap, and the danger of injury then is less than at other times. If the kerosene is carefully applied so that it will not run down the trunk and saturate the soil about the roots, it can be used upon nearly all kinds of fruit trees at this time. By using a fine nozzle it can be sprayed upon the trees and will go as far as twice the quantity of other insecticides.

For trees infested with San José and other scale insects this will be a cheap and effective remedy. Care should be taken to spray upon warm, bright days, and while the trees are dry, so that the kerosene will quickly evaporate and thus lessen the danger of injury to the trees.

TOBACCO.

Many insects can be destroyed by the use of tobacco dust or smoke, but for insects on orchard trees "tobacco water" will be better. It is particularly valuable as a remedy for plant lice, although to be effectual it should be applied before the leaves have closed over the insects. The decoction can be made by soaking a half bushel of tobacco stems in a barrel of water for five or six hours. If wanted for use immediately the water should be hot. The stems can be used for several barrels of water, the color and odor of the water indicating when they have been exhausted.

POTASH LYE.

For spraying trees while dormant to destroy insects, fungi, and secure a smooth bark, use

Black potash	2	pounds
(or concentrated lye	1½	")
Water	5	gallons

Care should be taken in preparing and applying this solution as it is very caustic. It can only be used while the trees are dormant.

The addition of one pound of lime and an ounce of Paris green to the above makes it especially valuable for the trunks of trees to keep away borers.

WHALE OIL SOAP.

For all classes of insects, and particularly for those that suck the sap, whale oil soap, made from fish oil and potash, is an excellent remedy. Among the best brands are those manufactured by James Good, Hurst St., Philadelphia, who sells his Potash No. 3, at three and one half cents per pound in barrel lots, and from five to ten cents in smaller quantities. The Anchor brand of Leggett and Brother, 301 Pearl St., New York, is sold at four cents per pound by the barrel, or at six and one half cents per pound for fifty pounds. Both are reliable brands.

For scale insects it should be as strong as one or even two pounds to the gallon of water, to be applied hot while the trees are dormant. After growth starts the amount of water should be increased to five gallons to a pound of the soap. Whale oil soap may be used in making kerosene emulsion.

FUNGICIDES.

As noted above the use of the fungicides is to cover the plants and to destroy the spores of fungi which fall upon them. For this purpose Bordeaux mixture is most valuable.

BORDEAUX MIXTURE.

Copper sulphate (granulated)	4	pounds
Lime (fresh)	4	"
Water	40	gallons

The above is known as the 'one to ten' formula and may be slightly modified without destroying its efficiency. When preparing Bordeaux mixture it is advisable to first make a stock solution that can be mixed and used as desired. Take twenty-five pounds of copper sulphate and suspend it in an old basket in twenty-five gallons of water. In a few hours it will dissolve. In a box slake twenty-five or more pounds of lime. (If it will be used within a week it will be well to slake the entire barrel.) Add water only as fast as it is taken up by the lime, but take care that it does not become dry and burn. In slaking a few pounds it is well to start it with hot water. When desired for use, for forty gallons take four gallons of the copper sulphate solution, after giving it a thorough stirring; place in a barrel and dilute to twenty gallons. Then take as much of the slaked lime as would be made from four pounds when unslaked, dilute this to twenty gallons and add to the diluted solution of copper sulphate. Pour together slowly and stir rapidly while doing so, that they may form a perfect mixture. The dilution might be made after the ingredients are mixed, but it soon settles to the bottom, and does not give as satisfactory results.

When fresh (unairslaked) lime is used, and the right proportions have been added, there will be no danger of injury to the foliage, but that there may be no mistake from having too small an amount of lime, it will be well to test the mixture in some way. This can be done by adding a drop or two of ferro-cyanide of potassium, and if it changes to a reddish chocolate color it indicates that more lime is required. When no change in color is produced it indicates that the amount of lime is sufficient, but a considerable excess will do no harm. Another test is to dip a knife blade into the mixture and if on drying a film of copper is deposited the need of more lime is shown. When good lime is properly slaked there will be no sediment, but it is always well to stir up the diluted lime water and pass through a brass strainer. The lint from burlap bags, which are often used, is likely to give trouble by clogging the nozzle or pump.

COPPER SULPHATE SOLUTION.

For use upon trees while dormant, the strong solution,

Copper sulphate	1 pound
Water	15 gallons

may be used, but for use after the fruit is ripening a diluted formula,

Copper sulphate	1 pound
Water	150 to 250 gallons

should be used. The amount will vary with the kind of fruit; apples will stand the stronger solution, while on peaches one pound to 250 gallons is as much as can be safely used. To be effectual as a fungicide when the diluted formula is used, soft water should always be employed.

LIVER OF SULPHUR.

Especially for the powdery mildew upon gooseberries, grapes, etc., a solution of liver of sulphur, (sulphide of potassium) is a valuable fungicide, as, after the fruit has set, it seems even more effectual than Bordeaux mixture.

Liver of sulphur	1 ounce
Water	3 gallons

It is not poisonous and is well worthy of trial where fruits that are nearly ready for use are attacked by fungi.

INSECTS AND DISEASES AND THEIR TREATMENT.

The following brief descriptions of some of the more dangerous insects and diseases of fruit trees are given with the hope that they may aid in the detection of the presence of these pests and secure their prompt treatment. Especial attention is given to those that come under the operation of the orchard and nursery laws of Michigan, in order that the persons selected as commissioners in the different townships may have some guide that will aid them in recognizing the nature of the trouble, and in determining the proper treatment or remedy. As the remedies often fail from the fact that the nature of the insect or disease is not understood, it is urged that when any doubt exists specimens be mailed to State Experiment Station, Agricultural College, Mich. They will be examined and remedies given if possible.

SAN JOSÉ SCALE.

This most dangerous of all our fruit-tree pests has been found in a dozen or more places in the state and undoubtedly exists in still others. Every effort should be made to destroy the colonies we now have and to prevent its introduction to uninfected sections.

The insect has little power of locomotion, but may be brought in upon nursery stock, or can be carried by birds, and ants and other insects, from tree to tree. It attacks all of our fruit plants and has been found upon various kinds of forest trees.

It propagates very rapidly and three or four broods may develop in a season, so that it will quickly incrust the branches of a tree, which will then look as if plastered with coal ashes. When they first appear, they have a louse-like form and can move about, but they soon settle down, insert their slender beaks into the bark and develop scale-like coverings. During the winter the partially developed scales are black in color, nearly round, flattened; and in most cases, as can be seen with a magnifying glass, have a small nipple at the center, surrounded by a well-marked sunken ring. The size is such that a single scale to the unaided eye looks like a small black spot. The full-grown scales are of a grayish-brown and reach one sixteenth of an inch in diameter. The scales are but loosely attached to the tree and can be readily scraped off. Beneath the shell-like covering the true insect can be found. These are yellow in color and on being crushed will be found to contain a yellow oily substance.

When the scales are scattered upon the young twigs a purplish color of the bark will be noticed and on cutting into the bark it will be found much discolored. This discoloration of the inner bark is caused by no other scale, and if this is present and the ring-like depression can be made out, it indicates that it is the San José scale. This insect will ruin, if it does not kill young fruit trees, and will render large trees unfruitful, and is to be dreaded particularly on account of its rapid reproduction and small size, which render it possible for it to obtain a foothold, and even spread to adjoining trees before it is discovered, as well as because it is difficult to reach and destroy every specimen upon a tree with a spraying solution, while the cost of the materials will make it an expensive undertaking.

In case one has but a few infested trees it will be cheapest and safest to uproot and burn them, especially if they are small and incrusted with the scale.

In attempting to destroy the scale by spraying, some material must be used that has considerable penetrating power. The leading remedies are whale-oil soap and kerosene, either alone, mechanically mingled with water, or as an emulsion.

As a winter treatment use either a solution of whale-oil soap (one pound to one gallon of water), or kerosene emulsion (one part kerosene, one part soft soap, or whale-oil soap, and three parts of water). A pump should be used to make the emulsion, and the agitation should be kept up until a cream-like mass is produced. In either case the soap should be dissolved in boiling water and applied while still hot. If kerosene is to be added to form an emulsion, the soap should be removed from near the fire before adding the oil.

Before spraying the trees it will be well to cut them back severely and remove as many as possible of the small shoots; thus the surface to be sprayed will be reduced, and what remains will be near the ground. The application should be very thorough, so as to reach every part of the tree and soak all of the scales. The insects are often under bits of bark, in the crevices of the buds and even beneath the surface of the soil, and pains should be taken that none escape. This application will kill most of the scales, but, as some may survive, another application should be made shortly before the buds open in the spring. At that time the bark will be full of sap, and, if a warm bright day is selected for the spraying, it will be safe to use undiluted kerosene, (except, perhaps, upon the peach) provided it is carefully applied. Care should be taken to use a very fine mist-like spray, and to use only as much as will hold to the bark without running down the trunks. If it is allowed to saturate the ground about the roots it may be fatal to the trees.

Nearly as good results can be obtained with less danger of injury to the trees, from a mechanical mixture of kerosene and water, using three or four parts of water to one of kerosene. Special spraying apparatus is required, among the best being the kerosene sprayer made by the Deming Co., Salem, Ohio.

About the middle of June the young insects appear and a careful watch should be kept for them. If any are found the trees should be sprayed with whale-oil soap solution, or with kerosene emulsion, with eight parts of water to one of kerosene.

THE CANKER WORM.

This insect has in some seasons done much harm to apple trees, and, when its ravages have been unchecked for two or three years, it has even killed the trees. There are two kinds of canker worm, as well as other insects of similar habits; one form deposits its eggs during October and November upon the twigs of the apple trees, while the other appears during warm spells of late winter and early spring. The female moths are wingless and, as they have passed their pupal form in the ground, the only way they can reach the branches is by crawling up the trunks of the trees. Some endeavor to trap the moths, as they ascend the trees, by placing bands of paper about the trunk and smearing them with printer's ink or tar; others use various other bands and traps, but to be effectual they must be applied before the moths ascend the tree, and must be kept in a condition to act as a barrier, whenever the ground is not frozen from October to May. As this is a serious task and as, even at the best, some of the insects may evade the traps, the principal reliance is upon spraying with arsenites.

Some failures are reported, but it is probable that the spraying was delayed too long, or that it was not thorough. The eggs hatch about the time the trees blossom, and if the trees have been infested in previous years, a thorough spraying should be given just before the blossoms open, and it should be repeated as soon as the blossoms have fallen, and again if necessary. The spray should be in the form of a fine mist and should cover every leaf. To hold the arsenite upon the trees it is well to add lime to the spraying mixture. This will also aid in determining when the work has been thoroughly done, and will permit the use of a larger amount of Paris green, or other arsenite. Although it will add considerably to the cost of the mixture, from the fact that nearly all varieties are attacked upon their foliage, if not upon their fruit, by the apple scab fungus, it will generally pay to add Bordeaux mixture to the spraying material. If Bordeaux mixture is not used, a good formula will be, one pound Paris green, ten pounds of lime and one hundred and fifty gallons of water; or use one fourth of a pound of Paris green with forty gallons of Bordeaux mixture.

BLACK PEACH APHIS.

For several years the orchards in the vicinity of Grand Rapids, and in various sections along the lake shore, have been injured by what is known as the "Black Peach Aphis." This is a brownish-black, shining insect that feeds upon the roots of the trees. The individuals are so small that they can barely be seen with the naked eye, but they often appear in such large numbers on the roots that they are easily detected. These insects suck the sap from the roots, giving them a flabby appearance, and the effect upon the foliage is so marked that one familiar with their work can readily detect their presence by this alone. The leaves are generally more or less drooping, and are of a dark yellowish-green color; they are generally smaller than the leaves on healthy trees and are folded and wrinkled. Another characteristic is that numerous red spots, due to the work of fungi, appear on the leaves. Later in the season, the injured portions fall from the leaves, which appear as if perforated with a charge of shot. Trees having the appearance given above, will almost certainly be found affected with the aphis, but in a few cases the same appearance has been noticed where the trees were planted deeply, especially if they were in hard-pan or a cold, wet soil. Most, if not all, of the Michigan nurseries are free from this insect, but it may appear unexpectedly in any of them, or upon trees brought in from without the state, and, as it is so destructive, it will pay to take precautions to destroy the insects if they should be on the trees. This can be done by dipping the trees in strong tobacco water, made by soaking one half bushel of stems in a barrel of water. If, later on, it should appear upon the trees growing in the orchard, the cheapest and most effectual remedy will be the application of from one half to one bushel of unleached wood ashes about the trees. It will be more effectual if the soil is scraped back over a circle as large as the branches of the tree, and replaced after the ashes have been scattered.

Tobacco stems or tobacco dust may be used in the same way and, like the ashes, will both act as an insecticide and furnish a large amount of plant food to the tree. The Black Peach Aphis is most troublesome on light sandy soils but may be found on the stiffest clays. For the most part, the insects are wingless and cannot move from tree to tree, though they are probably distributed by ants and other insects. They are found upon the roots during all of the year and in early summer they are found upon the young shoots and leaves; having been, perhaps, brought up from the soil by ants. The effect of the insect is particularly severe upon young trees, which are often, in nurseries and newly-planted orchards, killed by them. On old trees the effect is less severe and, if the trees are well cultivated and fertilized, they may be able to escape with a slight check to their growth. This insect is probably more generally distributed than is supposed, and may account for many of the failures in young trees which have been placed where old orchards have been taken out. In case it becomes desirable to replant with peaches, the land should be used for at least two years for some other crop, and an attempt should be made to increase the humus of the soil by turning under clover or other crops.

THE WOOLLY APHIS.

In several parts of the state apple trees are badly infested with the woolly aphis, which attacks the roots as well as the branches, causing knots and swellings to appear. If they are very numerous the fruit, when produced at all, will be small and imperfect and the trees will make but little growth. The root form can be treated with wood ashes or tobacco dust, and those on the branches can be destroyed with the kerosene sprays or strong tobacco water.

PEACH YELLOWS.

Yellows of the peach is placed under the jurisdiction of the yellows commissioners by the so-called, "Yellows Law," and in case trees are infected with this disease they can require the owners to destroy them within five days, or, if it is not done, they can have the trees destroyed and collect from the township the actual cost of uprooting and burning them.

Yellows may appear in trees of any age but is seldom seen until the trees come into bearing. It then shows in the premature ripening of the fruit, which takes on a very high color, anywhere from one to four weeks before its usual time to mature, and the surface is more or less covered with red spots. On cutting the fruit open, streaks will be found running from these spots to the pit, around which the color is found much deeper than in healthy fruit. In some seasons, however, certain fruits that naturally red about the pit have this color much heightened, so that these lines should not be taken as indicative of the disease. At about the time the disease appears in the fruit, indications of its presence may be seen upon the branches, where a number of small, narrow and pointed leaves may develop. When the trees are not in bearing this is the first indication that would be seen. Sometimes the disease does not appear until late in the autumn, when it manifests itself by the opening of winter buds, which normally would remain dormant until the next spring. These buds, along in November, develop short-jointed shoots, with small, yelowish-green leaves, which often remain upon the trees until mid-winter. Similar shoots often appear from the stumps of trees in which the disease has shown itself, and which have been cut down. The following year the trees will make but little growth, the leaves will be small, yellowish-green in color, and slender, branching growths will generally appear from the crotches of the branches, forming what may fruitgrowers speak of as "fungous growth." The trees become weaker each year and, at the end of two or three years from the time that they are first attacked, die from the disease. When yellows appears on, perhaps, one or two branches, many growers attempt to save the tree by cutting off the branches in which the disease has appeared, but in no case, so far as is known, have they been able to save the remainder of the tree. Even though a tree has a full crop of fruit upon it, it should be cut down and burned, on the first appearance of yellows, for, if left to ripen its fruit, the disease is likely to spread to other trees. By the prompt removal of diseased trees our growers have been able to grow peaches with but little loss from this disease, while those who failed to take prompt action have lost every tree in their orchards. This shows the importance of watching the trees carefully and applying the axe and fire when any symptoms of the disease appear. Some of our best growers make it a practice to go over their trees once a week, beginning three or four weeks before the variety will ripen, and thus are able to detect the disease upon its first appearance.

While the exact nature of the disease is not known, it is regarded as highly contagious, and no effective remedies have been found for it. It attacks all varieties and appears on all kinds of soil and in orchards under the highest cultivation as well as those in which the trees are suffering from a lack of proper food and care.

PEACH ROSETTE.

So far as known this disease has never appeared in Michigan. In Georgia and other states where it has been found, it is feared more than yellows as it kills in one year. It differs from yellows in various ways, one of which is that it has no effect on the appearance of the fruit, while in yellows the fruit is spotted, streaked, higher colored, and ripens from a few days to three or four weeks earlier than on healthy trees.

The name rosette is given from the fact that in the spring numerous slender shoots, with small, narrow, yellowish leaves, start out from the branches and, after reaching a length of from three to six inches, the buds in the axils of the leaves also develop shoots that bear still smaller leaves, and in Georgia a third series of branches may form. The leaves on these tufts are very small and may number one hundred or more and, crowded as they are, give the appearance of a rosette. There is no known cause or remedy for the disease and, as it seems highly contagious, trees that show the above described characteristics should at once be dug out and burned.

"LITTLE PEACH."

In various parts of Allegan and surrounding counties, a disease has appeared in the peach orchards, to which the above name has been given by most growers, although some call it "rosette" and others "a form of yellows." The trees have, in general, an unhealthy appearance; the new growths are short and spindling, the leaves are small, yellowish green, and inclined to roll, and, when the fruit is about an inch in diameter, its growth stops. Instead of being premature as in the case of yellows, the fruit, if it ripens at all, is much later; it shows no red spots and streaks, and seldom reaches one half its full size.

About mid-summer the trees will send out numerous shoots from the main branches. As a rule they are short, but, if the trees are young and growing in good soil, they may make a growth of several feet, forming what are commonly called "water sprouts." The bark on the growths two or three years old will be found dry and cracked; the cambium (or new ring of wood) very thin and the older wood dry and discolored beyond the normal.

After a year or two, young and vigorous trees seem to recover, but the old and especially the neglected trees gradually succumb to the disease, although they generally live for several years.

By many growers the disease is regarded as highly contagious and even more dangerous than yellows, and they recommend the prompt removal of the infected trees.

While the writer is not certain that the disease is contagious, such may be the case, and, especially if the trees are old and the wood seems to be badly injured, it will certainly be advisable from an economical standpoint, as well as safest, so far as the other trees are concerned, to immediately destroy them.

In some instances the writer has observed the disease upon young trees, and even on older ones, when the trouble seemed confined to portions along the middle of the branches, and, when cut back below the injured portions, new and healthy growths were made. Even when the branches have been but slightly shortened back, marked benefits have been secured, but it can be readily seen that the best results cannot be secured unless the injured portions have been cut away and a growth obtained from the comparatively healthy wood below. Unless the soil is fertile it should be enriched with a liberal supply of wood ashes. Stable manure would be desirable to start a new growth, and a small amount may be used to advantage, but an excess should be avoided as it will produce a soft watery growth that will be injured by the winter.

While some specific disease may be the cause of the trouble, in most cases it has every appearance of the effect of cold upon the unripe wood. In one case, young trees were growing in a corn field; after cultivation ceased the growth of the corn drew upon the moisture and plant food in the soil, causing the trees to ripen prematurely and, when the corn was cut, a second growth could readily be started by the fall rains, and this would be injured by the winter. In other cases, the wood may have been unripe in the fall, or it may have started into growth early in the spring and a few degrees of frost would in either case produce an injury to the wood similar to that found in "little peach." The cells being injured the sap would not pass through them readily, and the new growth would naturally be short, the fruit would not reach its normal size, and water sprouts would start from the branches.

In case the disease is found to be contagious it would come under the operation of the nursery law.

"GUM DISEASE" OF THE PEACH.

After rains in the early spring, patches of gum are noticed upon the twigs and smaller branches of peach trees, and examination shows the bark beneath to be ruptured. Sometimes the injury is near the buds, in which case it will generally be found that growth has started prematurely, or that it was not perfectly ripened in the fall, and has been injured by frost; the bark being ruptured the sap exudes. When away from the buds, the injury may be due to the same cause, but small spots are often found on the bark, that have been caused by fungi of various kinds, from which the sap has come. As preventives, spray the trees with fungicides, and use cover crops and mineral fertilizers, avoiding southern exposures where there is not free circulation of the air. If the branches are much injured they should be cut back below where the worst of the spots are found.

CURL LEAF.

Although not coming under the operation of the spraying and orchard inspection laws, yet the severe loss suffered last year, in all parts of the state, from this disease, makes it worthy of mention here. The effect of the disease upon the foliage of the tree is known by all peach growers. The tissues become thickened and the leaves become wrinkled and often more or less marked with yellow and red, and finally a whitish powder is seen upon the infected portions. In severe cases, all of the leaves, except those that have recently developed, drop from the branches of the trees, thus subjecting them to a severe check, and as a result some or all of the fruit drops from the tree—the amount varying with the severity of the attack. The disease is most troublesome in seasons when the weather has been wet and cold. These conditions cause a check to the development of the leaves and in that condition the spores of the fungus, which is the cause of the disease, readily gain access to the interior of the leaves. It is known that the spores and mycelium of the fungus winter upon the twigs, and if they can be destroyed the danger of the attack to the foliage will be greatly lessened. While the ordinary solution of copper sulphate, (one pound in fifteen gallons of water) is effectual in destroying these spores, better results are obtained with Bordeaux Mixture that contains a large excess of lime (five pounds of copper sulphate, ten pounds of lime and fifty gallons of water). If this is thoroughly sprayed over the trees, before the buds open, covering every portion of the trunk and branches, it will greatly lessen the danger of an attack to the foliage. As soon as the blossoms have fallen, a second application with the same mixture should be made and, if the weather is favorable to the disease, this should be repeated at the end of ten days or two weeks. Experiments for the last four years have shown that if the trees are sprayed as above recommended, there will be but little trouble from the disease. To be effectual, however, the spraying must be very thorough and must be done at the right time. Certain varieties, like Elberta, are much more injured than others, owing to the peculiarities in the growth and texture of the foliage, and when we have a variety that is little, if any, injured by the disease, it should be preferred in planting to others that are subject to the disease, providing they are of an equally valuable variety. As some of our best varieties are very subject to the disease, he should make use of the spraying mixtures who attempts to grow them.

CROWN GALL.

Many of the peach trees that have been brought into Michigan from Ohio and Maryland have shown upon their roots swellings of various sizes to which the name of "Crown Gall," has been given. These are most commonly found at or near the collar of the trees, but detached swellings have often been found upon the smaller roots. When upon large roots, or at the collar, the tree will be of little value and should never be planted, as, even if it lives, the growth will be unsatisfactory. The real nature of this trouble is not understood, but, even though it has not been definitely shown to be contagious, the trees should be regarded with suspicion. The swellings most generally appear in the nursery, and are most common when the trees have been grown in moist soil, especially if it contains a large amount of decaying organic matter. In case a tree growing in the orchard has been destroyed with crown gall, it will be safest to remove the soil and replace it with fresh materials before planting another tree. While it cannot be regarded as absolutely sure, it is possible that where there are but one or two small swellings, upon the smaller roots, the tree can be saved by cutting off the roots as far from the swellings as possible.

Care should be taken both by nurserymen and orchardists, in planting trees in wet soil, especially if the land contains a large amount of organic matter. Instances have been known where the disease was very troublesome on soils heavily enriched with stable manure, or where large amounts of saw-dust have been worked into the soil; also where raspberry plantations have been removed. Similar "galls" have been found on the apple, pear and plum, as well as on the raspberry and blackberry. Another form of gall, which appears as small nodules upon the roots, is due to the work of the "eel" worms (nematodes), but these are quite distinct both in their appearance and nature.

BLACK KNOT.

The swellings upon the branches of the plum and cherry trees, to which the name of "Black Knot" has been given, have been found very destructive. While in some seasons the growth is but slow, in others they develop rapidly and destroy entire orchards. The development of the knots begins during May and June, when, upon the branches that are one or two years old, a slight swelling will be noticed and the outer bark will crack, showing the green layer beneath, which will soon take on a russet appearance. Upon the surface an olive-green mould will soon appear, which is due to the development of summer spores of the fungus. These are borne about by the wind and serve to scatter the disease. The development of the spores continues and, by autumn, the surface will be of a black color, covered with innumerable minute pimples, in which the winter spores of the fungus will be developed. These will ripen in February and thus the disease will secure another start. The old "knots" are dry and hard and each year extend both ways along the branches, until they reach a considerable size. By carefully examining the trees during the early summer, the "knots" can be detected in the early stages of their development and, if at once cut off and burned, further spread of the disease will be stopped. In removing infected branches, the cuts should be made, if possible, a foot or more below the knots, in order that the diseased portions may be destroyed. When the knots are upon the trunks or main branches of small trees, where it would be impossible to cut them off without destroying the trees, the diseased tissues may be cut away and, if the wounds are painted with linseed oil, or tincture of iodine, the danger of stopping further growth of the tree or branch will be prevented. While the removal of diseased branches is the only remedy that can be depended on to prevent the spreading of the disease, yet, if the trees are thoroughly sprayed with Bordeaux mixture, it will be impossible for the spores to obtain ledgment upon the healthy branches. In several portions of the state, it is reported that the knots are becoming very troublesome and that they have destroyed many plum trees. In case the owners do not take prompt action to check the disease, the fruit growers of the locality have in their hands the power to see that the knots are destroyed, as it only requires a petition of ten free-holders to secure the appointment of commissioners whose duty it will be to secure the destruction of all knots and of the trees if badly affected.

PEAR BLIGHT.

The fire blight or "frozen sap blight" of the pear comes under the operation of the yellows and spraying laws. This disease is of a bacterial nature and is very troublesome in some seasons, particularly upon rapid-growing trees, or on land that has been heavily manured, or that is naturally rich in organic matter. The disease may appear upon the new growth, upon fruit spurs, or at any openings upon the branches and trunk where the bark has been cracked so as to permit the entrance of the germs. They can also enter through the flowers, or through the soft succulent tissues of the leaves or stems. The leaves upon the diseased portions turn dark brown and dry up, but remain for a considerable time upon the branches. The bark of the diseased portions also dries and becomes nearly black in color. When the disease is at work in the tissues the bark cracks and a thick sap exudes. This has a distinct taste and odor of fermentation and the disease itself is nothing more than a fermentation, brought about in the sap by the action of the bacteria. The remedy for pear blight is much the same as for "black knot," and, when any of the leaves show the characteristic appearance of the blight, the branches upon which they are should be cut off a foot or more below where any signs of the disease can be seen, and immediately burned. By the prompt removal of the diseased branches, the disease can generally be checked, while, if this is not done, it may spread until all of the surrounding trees are affected.

LEGISLATION RELATING TO INSECTS AND DISEASES OF FRUIT TREES, AND PRELIMINARY REPORT OF THE STATE INSPECTOR OF NURSERIES AND ORCHARDS.

BY L. R. TAFT AND D. W. TRINE.

At various times during the past sixteen years the state of Michigan has passed laws to prevent the spread of dangerous insects and diseases that have appeared in the orchards, but many fruit growers are not even aware of the existence of these laws and few, even of those in whose hands their enforcement has been placed, are informed regarding their requirements.

The first "Yellows Law" was passed in 1879 and has been several times amended until as it now stands upon the statute books (Act 109 Laws of 1895), it includes, (in addition to the yellows) peach rosette, black knot and pear blight. In 1895 the so-called "Spraying Law" was passed, but it was amended in 1897, and is now Act 2, Laws of 1897. Both laws provide for the appointment of commissioners in the townships where diseases or insects exist, and those appointed under one law have full power to enforce the other.

In 1897, another law known as the Nursery and Orchard Inspection Law was passed. This provides for the appointment of a state inspector whose duty it is to examine all nursery stock sold in the state, and such orchards as are supposed to contain dangerous insects or diseases, and take measures for their eradication.

All nurseries and tree dealers selling nursery stock in the state are required to have their stock inspected, and to take out a license and to give a bond for one thousand dollars that they will sell no stock that has not been inspected, and are, if requested, required to furnish a list of their customers for the use of the inspector. The license and bond of a nursery answers for its agents. Nurseries with headquarters in other states, which actually do business in Michigan, are also required to take out a license and give a bond, but no bond is required where they merely fill mail orders.

Nursery stock shipped into the state must be accompanied by a certificate of inspection from some authorized inspector, and, if not so accompanied, the transportation company must immediately notify the State Board of Agriculture. The law does not interfere with the delivery of the stock to the consignee. The Michigan law will be found printed in full elsewhere in this bulletin.

There is a law now before congress which prohibits transportation companies, postmasters, etc., from receiving nursery stock of any kind that is not accompanied by a certificate of inspection.

DUTIES OF OWNERS OF LAND.

Owners are required by law, in case they have peach trees diseased with yellows and rosette, to forthwith destroy the trees and fruit, and to cut off and destroy the portions of pear trees diseased with blight, and black knot upon plum and cherry trees.

When trees are infested with canker worms, San José scale and other injurious insects, or are infected with dangerous diseases, owners are required by law to effectually spray the trees, or, if necessary, to destroy them. Spraying, except for the canker worm, is prohibited while the trees are in blossom. Under the spraying law such injurious diseases and insects (aside from those mentioned above) would naturally be included, as are not commonly distributed, or which if not destroyed are likely to injure neighboring trees.

In case notice is served on the owners, by the commissioners, or by the State Inspector of Orchards or by his deputies, requiring the destruction or the spraying of the trees, (unless they avail themselves of the right to appeal as noted hereafter) they must comply with the requirements within five days or they will be subject to fine or imprisonment.

DUTIES OF TOWNSHIP OFFICERS.

When any township board or city council are aware of the presence of dangerous insects or diseases, within their jurisdiction, or when ten freeholders petition for it, it is their duty to appoint three competent freeholders as commissioners, who shall hold office during the pleasure of the board and until their successors are appointed. If the township officers neglect or refuse to make the appointment, they are subject to fine or imprisonment or both.

DUTIES OF THE COMMISSIONERS.

The commissioners shall, within ten days after appointment, file their acceptance with the city or township clerk, who shall be the clerk of the board and keep a record of their proceedings.

It is the duty of the commissioners, or any one of them, to examine any trees supposed to be infected with dangerous diseases or insects, and if the diseases or insects are found, they must put some mark upon the tree and serve notice upon the owner to destroy the tree if it is infected with yellows, or to cut off the diseased portions if it is black knot, pear blight, etc., or to effectually spray the trees in case of dangerous insects, within five days. When infected with San José scale the commissioners can, if deemed necessary, order the destruction of the trees. When the owner neglects to comply with the law within five days, it becomes the duty of the commissioners to have the trees destroyed, or effectually sprayed, as may be necessary. The commissioners are allowed for their services two dollars for each full day, and this and their other expenses must be audited by the township board or city council. Their expenses for destroying trees affected with yellows, or cutting back those with black knot or pear blight are levied upon the premises by the supervisor and collected the same as delinquent highway taxes, but for spraying or destroying trees affected with San José scale, and other injurious insects and fungous diseases, the expense must be recovered by the township from the owner of the premises in an action of assumpsit.

If the commissioners neglect their duties they are subject to the same penalties as the township board.

APPEAL.

In case the owners question the decision of a single commissioner they can appeal to the full board, and if not then satisfied they can have the matter referred to the State Inspector of Nurseries and Orchards, whose decision will be final.

For information regarding the duties of the State Inspector of Nurseries and Orchards, reference is made to Act 137, Laws of 1897, printed herewith.

PRELIMINARY REPORT OF THE STATE INSPECTOR OF NURSERIES AND ORCHARDS.

INTRODUCTION.

The Michigan legislature of 1897 passed what is known as the Nursery Inspection Law (Act 137, Laws of 1897) which required the State Board of Agriculture to appoint a state inspector of nurseries and orchards, and made it obligatory upon all nurserymen doing business in the state to have their stock inspected, and to take out a license and give a bond that they would comply with the provisions of the law. The law went into effect September 1, 1897, and the board appointed Prof. U. P. Hedrick, late of the Oregon Agricultural College, as inspector under the law. He entered upon his duties about the middle of the month, but resigned at the end of the year to accept the professorship of horticulture in the Utah Agricultural College. Mr. D. W. Trine was appointed as his successor.

Of more than one hundred nurseries inspected none were found to be infested with San José scale, although the scale was found on the premises of three tree dealers who had heeled in surplus stock. In neither of these cases was there any nursery stock growing in the vicinity that will be sold, and as all the trees that could be regarded as suspicious were at once burned, it is hoped that it has been stamped out.

The law permits fruit growers to dispose of surplus plants, but all other parties who sell nursery stock in Michigan without complying with the provisions of the law are subject to fine or imprisonment, or both.

Some nurserymen have given the impression that the certificate of the inspector "guaranteed" the stock, but it does nothing of the kind, as it merely states that he has examined the stock and has found no trace of injurious insects or dangerous diseases. It in no way guarantees the stock to be true to name or even well grown, and should not be understood as applying to the quality of the stock except as above stated.

ELEMENTARY SCIENCE BULLETIN NO. 1.

BY PROF. W. J. BEAL

OBSERVING AND COMPARING BEANS AND PEAS BEFORE AND AFTER SPROUTING.

The habit of observing plants, animals and other things in detail will be useful to any person in any occupation all through life, and it will also frequently be a source of great satisfaction.

The reason for suggesting the work mentioned below, is to induce pupils of the common schools of Michigan to become better observers. No one can make a person an observer by telling him all about many things. The pupil must learn for himself, if he ever learns at all.

For over thirty years the author has been teaching Botany to large numbers of young persons from the age of five years and upwards, and he has invariably met with best success by giving each, one or more specimens to be studied without assistance from person or book. After each has had a chance to tell what he has discovered, then perhaps some hints are given for future work, and very likely some questions are asked and some are answered. This mode of teaching stimulates inquiry, originality and independence, though indolent pupils like to have the teacher explain everything from the start. It is so much easier and saves time and effort of the pupil. If the intention were merely to impart information, short lectures or book-lessons about botany might possibly be the proper way, but the author believes the power of observing accurately and quickly to be of far more lasting benefit to any one than information acquired during a few weeks or a few terms at school.

For the present, I shall take it for granted that the teacher has never studied botany in the ordinary acceptance of the term. If she possess little knowledge of the subject, let her have no fears on that account, for she will not be expected to tell the pupils much of anything about the work. We hope she may become interested and learn more than any of her pupils. The exercise here described is laboratory work for the children, not necessarily for the teacher. My plan was to make it an object lesson, detailing some things to be done, not to serve as is too often the case, a subject for a short lecture to the school. Far better results are attained when the topic is worked out by the scholars, than could be reached by any number of interesting talks with no effort on the part of the classes.

To some extent we think this exercise will be found to be in the line of recreation, and with the study such as here suggested, the pupils will make just as rapid progress in arithmetic, geography, grammer, spelling and penmanship as they would if this seed-study were omitted. We hope you will give the plan a good trial, and then by all means let me hear from you, stating any difficulties encountered and noting successes as they occur to teacher or pupils.

In learning to observe, it is a most excellent plan to place two objects side by side in similar position, taking notes of differences and points of resemblance. For this first lesson I have selected beans and peas, because they can be easily obtained and because they are of good size. Let some members of the school make a winter garden, not for the purpose of raising large crops to fill barn or cellar, but for the purpose of study in learning to see accurately many little things. The work of preparation may be divided, but you will need a box or pan about one foot across, nearly filled with three inches of nice garden soil or sand suitable for making mortar; fifty to one hundred common white beans, and the same number of peas of almost any kind. Ten or more beans and ten or more peas may be placed in water over night and then planted about an inch and a half apart each way, and an inch deep. In another part of the same box or in a separate box, five soaked beans and five soaked peas may be left on top of the moist, loose soil, and five of each on soil that has previously been pressed smooth. The seeds placed on top of the soil must be covered with a deep saucer or something of the kind, to prevent them from becoming dry. A little water should be added occasionally that the planted seeds may be kept moist, but not soaking wet.

While the seeds are slowly begining to grow, each member of the class will carefully compare several dry beans with each other, several that have been softened with each other, the dry beans and the soft beans with each other. In like manner they will study several peas and then compare the beans with the peas to discover in what respects they differ from each other and in what respects they resemble each other.

The suggestions above made with reference to the best way to become a good observer, will not be followed in this, the first bulletin of the kind from the Agricultural College, for fear pupils may become discouraged and not be able to perform creditably what is expected of them.

For these reasons, a plain statement will be made of some things that can be discovered, and in this way the text and illustrations will serve to prepare young persons for independent work suggested by future bulletins.

It will be well for you to keep pencil and paper handy for notes, drawing and dates, each keeping his own account.

These are rather small and short white beans now before us. As they rest on the table while I poke then about, you observe that all of them lie on one side, but some are considerably more flattened than others. If we try to find a couple that are an exact match, we fail. They differ in size, color and shape in some respects. The seed-coats of a few are more or less wrinkled, while most of them are very smooth. They are all longer one way than they are the other. Some of the shortest have both ends rounded much alike, while most of them have one end more or less flattened, slanting across. There is a little one over there with its back considerably rounded.

On one edge is an oval spot more or less sunken, and in the middle of this depression there is a little bunch or scar, and near one end of the scar is a small pimple of a brownish color, and at the opposite end from the scar, if the bean is held in a very strong light, some bright eyes may possibly discover a little hole.

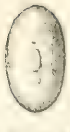

Fig. 1. Edge of a swollen bean showing seed-scar between a small pimple and a minute hole.

You perhaps remember that beans grow inside of pods and when you tried to shell them, they stuck more or less to the pod. Yes, and here is the scar where the seed broke away from the pod!

Let us look at the dry peas. We will suppose they are an early kind grown in the garden and you saved them for seed this year; but they look as though they were mixed for they are so unlike each other. Some are so smooth and so nearly the shape of a ball that they can hardly lie still; some have one or more dimples, and others are more or less wrinkled. They are mostly cream-colored. The scar, unlike that of the bean, has a little slit lengthwise through the middle, and the depression about it is narrower than the one we saw in the beans. The little shiny pimple of the pea is much farther from its scar than it was on the bean and no hole can be discovered at the opposite end of the scar.

We will suppose that some of the youngest boys and girls became tired at this point, and began to look out of the window, or they had lessons to learn or it was most time for recess or for dinner, and we informally put the beans and peas out of sight.

Last night in preparing for this second lesson, the teacher was thoughtful enough to put some beans and peas in water, and a few minutes ago she put another lot in water. How queer! The beans that were in water for a few moments are much wrinkled in every direction as though their jackets were to large, but the peas are still smooth as when put into the water.

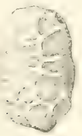

Fig. 2. Bean soaked in water for a few minutes. The seed coat enlarges before the thicker portions inside.

In a little while the peas will show irregular wrinkled patches and by that time the wrinkles on some of the beans will begin to disappear. Perhaps some of the pupils observed that the wrinkles on beans and peas, which had been wet only for a short time may be explained in this way: the covering became soft and enlarged before the thicker portion inside had swollen.

Let us look at the beans and peas that were in water over night. You see they are all smooth without a dimple or wrinkle and they have swollen considerably, but they still differ in color, shape and size. On the edge of the bean near where the small hole was found, a little ridge appears, and the corresponding part of the pea shows a conspicuous ridge of a lighter color than the rest of the pea.

On carefully removing the seed-coat from a bean, the depression which was beneath the scar, is still seen, and near it is a rounded part which made the ridge in the seed-coat, and this ridge is fastened to the two large seed-leaves of the bean. This small rounded object holding the seed-leaves together is the first stem the plantlet has and its behavior in future is to be carefully watched.

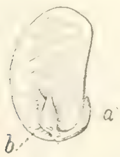

Fig. 3. Bean split in two; *a*. the first stem, *b*. the first true leaves slightly enlarged.

Between the seed leaves is a white flat, two-pointed object, to be noticed in sprouting beans.

On removing the seed-coat from a soft pea, the rounded light-colored point is more prominent than it was in the bean, and there is a little thing (bud) between the seed-leaves.

Let us again turn our attention to the seeds placed in and upon the earth in the boxes. If the schoolroom is likely to become very cold during the night, some scheme has been devised to cover them, boxes and all, with other boxes or blankets. It may be noticed that peas endure the cold better than beans.

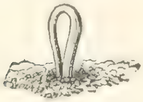

Fig. 4. Sprouting bean bursting through the soil.

The first thing seen of beans planted in the soil, is an arch or ox-bow pushing its way to the light, and later, one end of this bow pulls up the seed-leaves back end first. In most cases the seed-coat was left in the soil where the bean was planted, but if not, then two green, rough, pointed leaves coming out from between the seed-leaves pushed off the seed-coat which dropped to the ground.

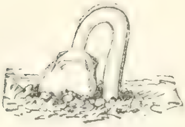

Fig. 5. The young stem of the seedling bean pulling the seed-leaves out of the ground.

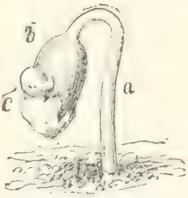

Fig. 6. *a*. First young stem of a bean-plant, *b*. seed-leaves, *c*. seed-coat.

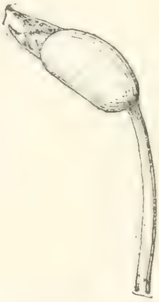

Fig. 7. The seedling bean with seed-leaves above ground showing two true leaves that pushed off the seed-coat.

If we examine these green leaves we shall see that each one is folded with one-half facing the other half and then the two leaves as folded in this way overlap each other. The leaves are placed opposite each other and are shoved outward and upward by the growth of a short stem. When several inches high, one or more pupils will discover a tender bud between the two rough leaves and about it are four little slender pieces. Still later the leaves open more or less and the lower part is seen to be in the shape of a section of a heart as usually seen in drawings.

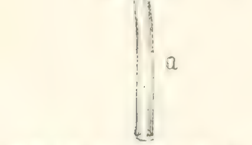

Fig. 8. *a*. First stem of bean-plant, *b*. a seed-leaf, c. bud, *d*. heart-shaped leaf.

A pea buried in the soil also pushes up an ox-bow much like that of a bean, but the seed-leaves instead of showing themselves, like those of the bean, remain covered where they were planted. The fact is the stem below the seed-leaves of the bean, between seed-leaves and roots, grows to be four to six inches high, while the corresponding part of the pea fails to stretch out much, if any, remaining very short, thus permitting the seed-leaves to remain below. The portion of the stem of the pea making the ox-bow, appears above the seed leaves and not below them as in case of the bean. The small bud between the seed-leaves of the pea does not come straight out, point foremost, but doubles up and pushes hard with its back bursting the seed-coat, leaving a small hole, and then the arch keeps moving or pushing its way out of the soil.

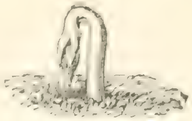

Fig. 9. Young seedling pea as it appears above ground, the seed-leaves remaining below.

Why do you suppose peas and beans in growing out of the soil, come out double in form of a bow, instead of sending the tip of the seed-leaves or the stem straight out? Very likely this is the correct explanation. It enables the young seedling the better to break through a hard soil without injury to the tender plant.

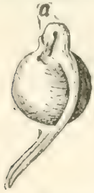

Fig. 10. The first tender bud of the pea backing out from between the seed-leaves.

As the young plant grows older the seed-leaves become smaller and withered, as their substance is carried out to nourish young roots, stems and tender leaves. Half an inch or more above the seed-leaves of the pea appears a single three-pointed scale, and above this and part way around the stem is another scale rather larger and more or less green.

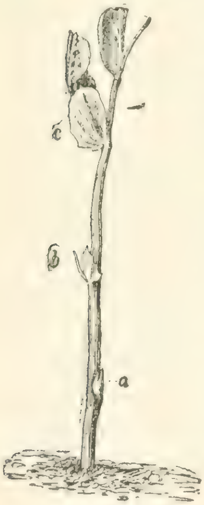

Fig. 11. Seedling pea: *a*. first leaf, *b*. second leaf showing a small tendril, *c*. third leaf and a fourth just appearing to the left.

In this, the second scale, there are two pieces facing and matching each other as they press against the stem, and between them curling outward is a small, slender, green object. At the third step up the stem, are seen two rather large, flat and green objects, between which spread out from the main stalk a small stem about an inch long with a groove on the upper side, and at the end of this are two more flat green objects with a little, slender tendril between them. All of the first or lowest three-pointed scale on the main stem represents or really *is* a small leaf, and the same is true of the second three-pointed scale; likewise of all that appears in the third place as above described. Such a leaf is called compound, as it is composed of more than one piece. If the pupils were to pursue the subject further, they would see some of the other leaves containing a larger number of parts, and the little, slender curl become longer and branching and ready to curl about and cling to any straws and sticks that happen to be within reach.

Kept on moist soil, sand or fine gravel, peas were seen to send out a root, which curved about more or less, usually keeping its tip to the ground. In some cases this tip found its way into some little crevice and kept on its way downward, but in other cases on the smooth surface with nothing to bear down and hold it, the peas tilted over, and again the root-tip turned toward the soil. After continuing and wandering about perhaps for two inches with a curve high in the air, several side roots branched out, grew to the soil and came to the rescue. If kept well moistened continually, the main root and its smaller branches beginning a little way back of the tips, were seen to have all over the surface for half an inch, the appearance of white velvet caused by immense numbers of root-hairs.

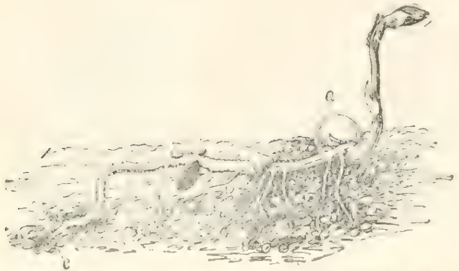

Fig. 12. Seedling pea stilted up on roots as it behaves on coarse wet sand. *a*. remains of the seed. *c*. tip of the first root The root-hairs lifted up a few small stones which stuck fast.

These tender things are the feeders of the roots and find their way into every nook and cranny, sticking to the sand, gathering in water and other stuff useful in helping to nourish the plant. If a root or its branch does not succeed in entering the soil, it soon dies, but when once connected with good, moist soil, it thrives and enlarges and does much work for the rest of the plant. Uncovered and exposed to dry air, even for a few minutes, causes the root-hairs to wilt and die, and none will ever appear in their places.

The roots of beans kept on wet soil, behave much the same as roots of peas, but the seed-leaves and main stem, how different! There is not only one bow or arch in the stem below the seed-leaves, but often two of them.

Children, young or older, may be questioned as to the various uses of the beans and peas, not overlooking the fact that the main object of the production of seeds is to grow more plants to produce more seeds and thus keep up the stock for many generations.

If so disposed, numerous experiments can be tried with profit; such as cutting off all of one seed-leaf, before or after sprouting, and see what follows. Split some beans and peas and see if each half can be made to grow. Cut off the stem that comes out between or above the seed-leaves of the bean or pea, and see one or more branches appear below to take its place. After it gets pretty well rooted, cut off the stem of a bean-plant below the seed-leaves and give it good care and wait to see if buds can be made to appear. Beans may be pushed into damp soil but little below the surface, some with one end up, some the other end up, some with the seed-scar or eye-edge up, some with the seed-scar below, and see how they behave.

The hints given in this short bulletin by no means exhaust the subject, for there is enough remaining to occupy the entire time of the best botanist continuously for many weeks.

OBSERVING AND COMPARING WHEAT AND BUCKWHEAT BEFORE AND AFTER SPROUTING, AND A COMPARISON OF THESE WITH BEANS AND PEAS.

BY W. J. BEAL.

In the first School Bulletin the writer gave young persons some instructions for observing and experimenting with the seeds of beans and peas. Keeping these hints in mind and without further help, pupils are now asked to show their ability in doing similar work with wheat and buckwheat. As with beans and peas, so in the study of wheat and buckwheat, pupils will need boxes of soil or sand, one hundred or more grains of wheat and the same of buckwheat. They may make the same kind of an examination while the objects are dry and after remaining in water a few hours; they will place some on the surface and others beneath the surface, making notes and drawings, not forgetting to compare wheat and buckwheat with the seeds formerly studied. These seedlings should be watched and compared till they are two or three inches high, especially noting the marked differences between them. In addition to this, some one or more of the willing and earnest girls or boys may place ten or more soaked kernels of wheat on wet sand covered by a dish. Look for the first sign of a sprout, and then at once remove the grain to a dry place and keep there till the tiny sprout is dead, and then replace under cover on wet sand and when growth is renewed, remove as before to a dry place and so keep up the work to see how many times a kernel can be sprouted, each time after drying. One or more pupils may do the same kind of work with buckwheat and see which side will win in the contest. Notes and comparisons may be made as the process goes on and finally reports will be made to the teacher or to the class.

It is sincerely hoped that the teacher will permit one class or more of pupils to complete their experiments and notes before letting them know what is contained in the following portion of the Bulletin.

Below are presented some notes and illustrations, which give a very good idea of what it is hoped some or many of the children will be able to discover and describe. Many other points could be named, and very likely some of the children will discover things which are here omitted.

In examining five dry grains of wheat, they find each differing somewhat in size, shape, color and markings from all the others. The kernel is about one fourth of an inch long and wrinkled more or less. There is a narrow groove running lengthwise on one side and on the opposite side near one end is a peculiar wrinkled spot nearly circular in outline. At the very base of the kernel near the circular spot, is a small scar where the grain was broken from the parent plant. At the tip of the kernel are numerous very short, white hairs. Perfect or well developed kernels of one kind of wheat resemble each other more closely than kernels of different kinds of wheat. Kernels of wheat kept in water three to eight hours, are softened and enlarged and are then mostly free from wrinkles. The circular spot near the base of the kernel has smoothed out, excepting a shallow groove around the outside.

There is much difference between kernels of buckwheat. One kind, known as the silver-hull, has a gray color, and the corners are rounded more or less and the sides bulge out considerably. Another sort, usually known as common buckwheat, is dark brown in color and has three sharp ridges running lengthwise of the kernel, while the sides are flat or more or less depressed. Kernels of wheat and common buckwheat are often nearly of the same length, though in most cases wheat is the longer. The lower end of a grain of buckwheat is larger than the upper end, and if it were not rubbed too hard in threshing there will still be found the remains of some brown scales, and at the base a small scar where it was joined to the plant while growing and at the apex of some of the kernels may yet be found three little club-shaped things which usually turn downward near the sides of the grain. The buckwheat after soaking in water is somewhat enlarged and softened.

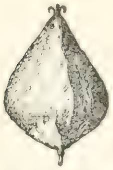
Fig. 13. Grain of buckwheat three times natural size.

The circular spot near the lower end of a kernel of wheat kept on wet earth, no matter in what position, is usually soon split open and a short white bunch is thrust out directly away from the kernel. This white sheath soon splits open at the end and a slender root pushes out, and excepting the naked end this root is soon covered by a downy material, the root-hairs. Before this single first root has made much progress, another one appears on each side, a little smaller than the first one, but in other respects the same, making three in number, and before long still another comes out on either side making five in all. Very likely it may not be long before the side roots catch up and some of them possibly overtake the first one. For a considerable time before all the roots appear, there is another single greenish-white object destitute of hairs and shorter than the roots pushing in an opposite direction.

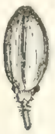
Fig. 14. Grain of wheat enlarged pushing its first root from a white sheath.

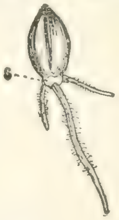

Fig. 15. Grain of wheat showing three roots, each coming from a short white sheath.

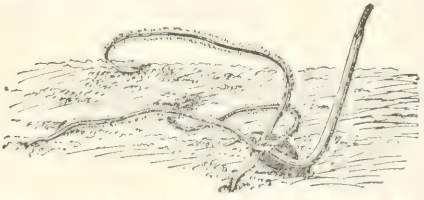
Fig. 16. Grain of wheat showing five roots, and at the right two leaves are shown, one within the other.

A kernel of wheat is not heavy and the roots are small and soon clothed with root-hairs. The kernels left on the surface are not unfrequently raised above the soil and kept there by the several roots in a spider-like manner. Sometimes some of the roots grow faster than others and they push the kernel over on its "back," but some of the curving roots aided by the hairs, unless allowed to dry, are sure, sooner or later, to enter the soil and secure water and other materials.

After a kernel has roots half an inch long, we are able to pick out the round spot near the base of the kernel and find the roots at one end and the stem at the other are held together, leaving a mealy and gummy portion in the covering of the grain. This gummy portion is intended to nourish the young plant which has one very small seed leaf.

Where kernels of buckwheat are placed on wet soil and kept covered with something to keep them from drying, the first thing to appear is a tiny, smooth root coming always from the pointed end of the kernel, and if the point of the kernel is uppermost this root usually turns at once down toward the soil. This root of the buckwheat does not burst out of the larger white sheath as do those of the wheat, but they are smooth and of even size, as were those of the bean and pea. The hairs on the root do not begin to appear till the root is about as long as the grain. The root-hairs do not cover all of the tender portion outside the hull, but have a portion at the base as well as the tip which is smooth. This smooth portion next the kernel is a genuine stem and not a root, and is to the buckwheat what the smooth stem of the bean displayed between seed-leaves and roots is to the bean.

After kernels of buckwheat have sent out sprouts half an inch long, it will be well to open one or two. On removing the dark-brown hull, we shall still see a lighter-colored covering, with a queer yellowish-brown circular spot, containing a darker speck in the center, where the seed was attached to the lower end of the hull or covering.

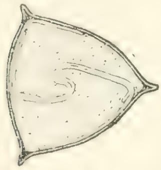

Fig. 17. Grain of buckwheat cut across, showing the two thin seed-leaves winding through the mealy portion.

If we carefully remove the light-colored seed-coat, if not too dry we find a white mealy substance surrounding two wrinkled pieces attached to the slender white stem, one part of which had escaped through the small end. These thin, wrinkled pieces are the seed-leaves and correspond to those of the bean and pea. In beans and peas all the nourishment was stored in the very thick seed-leaves, while kernels of both wheat and buckwheat have a starchy substance outside the seed-leaves.

The slender root of the buckwheat winds about on the damp soil for an inch, or sometimes even two inches, before a few side rootlets begin to appear near what is the upper end of the main root where it joins the smooth stem.

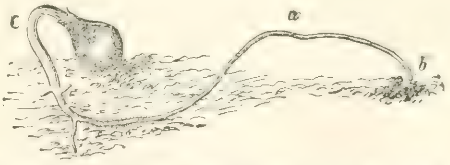

Fig. 18. Buckwheat germinating on wet sand showing a stem at *c*, and one long root, *a*, *b*.

In kernels of wheat that were planted, no matter whether one side or which end was down, the first thing to appear above the surface was a single, slender, nearly straight light green piece, abruptly pointed and usually carrying one or more drops of water. Like the pea the wheat kernel remains below the surface where planted.

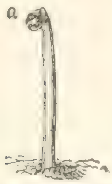

Fig. 19. The first true leaf of wheat peering above the soil consists of a closed sheath or tube often with a drop of water near the top.

When the light green portion of the sprouting wheat is half an inch or a little more above the soil, if held with the side to the window, one can see that below the tip a little way, the color is darker green, and when up about an inch, more or less, this darker green portion pushes a little way out of the lighter portion. This light lower part is the first true leaf and is a closed tube or sheath for nearly its whole length. The greener portion pushing up out of the tube is the second true leaf, and after it is two to three inches high it unrolls from each edge and flattens out more or less becoming twisted.

The true leaves of beans, peas and buckwheat are more or less rough and have a small framework crossing here and there, or, more properly the veins, running into each other in many places not unlike the threads of a net while the leaves of the wheat are very narrow with framework extending lengthwise.

The kernels of buckwheat planted in the soil with the point down, are shoved up big end first, with a crook-neck not far from the kernel, while the kernels buried with the large end down or the side down, first show above the surface a light-colored bow after the manner of the bean.

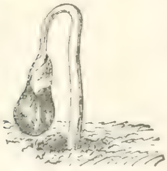

Fig. 20. Seedling of buckwheat with seed-leaves still partially covered by the hull.

Like the bean, the buckwheat sends its seed-leaves above the soil by a clean stem considerably lengthened, connecting the roots below and the seed-leaves above. After coming out of the ground half an inch or more, the lower part of the twisted seed-leaves begin to show and are of a light green color, the hull still covering their tips. In time the brown hull drops off and is found to be empty, as the tips of the tender seed-leaves apparently took in all of the starchy matter, and then the stem became erect and the seed leaves spread apart, displaying a little bud between. The seed-leaves do not match each other exactly as one hand of a person matches the other, but the left side of each is larger than the right, giving the plantlet a peculiar appearance.

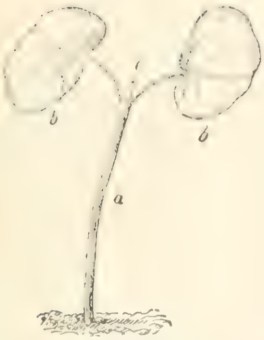

Fig. 21. Seedling of buckwheat, *a* the first stem, *b*, *b* the seed-leaves, *c* the first bud.

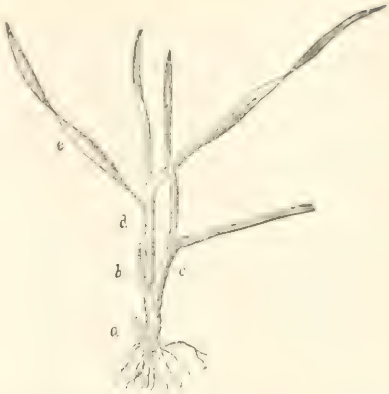

Fig. 22. A healthy seedling of wheat grown in good soil in the field with plenty of light, *a* remains of shriveled kernel, *b* first leaf consisting of a sheath burst open, *c* second leaf, *d* branch bearing three twisted leaves, one above the other. Leaves of wheat while young and later are nearly all twisted in the same direction.

A STUDY OF THE SEEDS OF TIMOTHY AND RED CLOVER BEFORE AND AFTER SPROUTING.

BY W. J. BEAL.

While it is not absolutely necessary that pupils should be familiar with the work planned in bulletins one and two of this series, before undertaking the observations suggested in the present bulletin, it will be much better if they have had the former work. They will need one or more boxes of good earth and one or more of sand, a small quantity of seeds of timothy and clover. As mentioned in other bulletins, so here, there are two kinds of seeds to compare in study and in germination. The pupils will compare several seeds of each kind with each other while dry, and when soaked, and in both cases seeds of timothy with those of clover. Some seeds should be left on top of wet soil or sand and covered by a bowl or saucer, others should be covered with soil perhaps an eighth to a quarter of an inch deep and not be allowed to dry.

One or more trusty pupils may lay a piece of muslin on a dish of wet sand on which may be placed a few seeds of clover and timothy. On the first appearance of germination the seeds should be removed, well dried (not heated), and then exposed to moisture until again sprouting begins (if it does begin) and again dried as before, repeating the operation till all seeds fail to start to grow.

The children will doubtless soon discover that timothy is in many respects much like wheat and that a clover seed is much like a common bean. When kept for a time on wet cloth, the seeds of clover produce stains of some interest.

Here permit me to urge the teacher to encourage pupils to proceed and make all the discoveries they can, singly and by consultation, before giving them the following information which may well be called a key of answers to the subject. To teach the mere facts enumerated below is not the object of this bulletin, but to stimulate girls and boys to observe and arrive at correct conclusions.

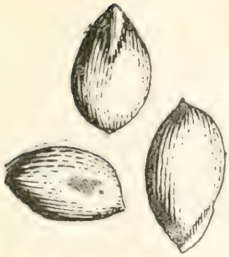

Fig. 23. Grains of timothy magnified fifteen times.

Some of the dry timothy seeds will appear clean and naked, while others will be partially enclosed by two small scales or chaff. In proportion to its length, a grain of timothy is rather thicker than a kernel of wheat, and has no grove along one side. There is a small spot near one end, as there was found in the kernel of wheat, where the sprout was seen to come forth.

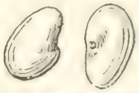

Fig. 24. Seeds of red clover dry, magnified six times.

The seeds of clover vary in color from light yellow to dark purple, the yellow being produced by light colored plants and the dark purple seeds by the dark green plants. Unless well screened, the seeds vary much in size and considerably in shape. Like those of white beans, they are somewhat flattened and have a small scar on one edge. The first little stem of the seedling inside is rather large and causes the seed to swell considerably along a portion of one edge.

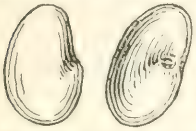

Fig. 25. Seeds of red clover soaked, magnified six times.

As in wheat, so the small grain of timothy remains on the surface of the ground or beneath it while sending up a slender blade to the light. Wheat left on the surface of the wet soil is sometimes stilted up, spider-like, on three and finally on five slender roots; not so with timothy. The latter produces but one main root pointing away from the base of the grain and it sticks to the soil held by the long root hairs. After a little, other roots appear near the little stem or as branches of the first main root. The first representation of a leaf consists of a light colored sheath much like that seen in wheat, and from this comes forth another and above and within still others in succession, which are narrow and slightly twisted, and the twist is in the direction taken by a screw driver while turning a screw into wood, the same as found in the leaves of wheat. If kept moist under a tumbler the tip of each leaf usually holds on the surface a small drop of water. It may interest some of the children to touch these drops with the point of a needle and watch the result.

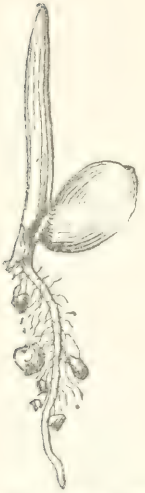

Fig. 26. Seedling of timothy showing the grain, the first leaf as a sheath, the single root bearing few root hairs above the tip, and these hairs have caught onto grains of sand.

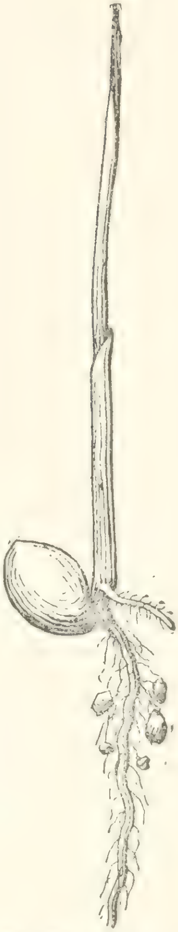

Fig. 27. Seedling of timothy, farther advanced, showing a second small root and a twisted leaf blade above the first sheath.

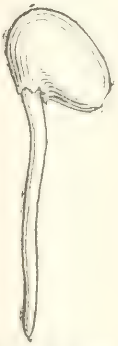

Fig. 28. Seed of red clover germinating; the tip of the sprout is a root, the portion next the seed is a stem.

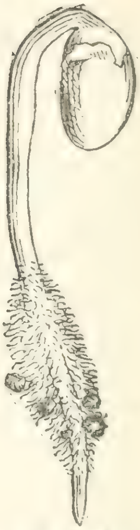

Fig. 29. Seed of red clover in a more advanced stage of germination, showing root hairs and a few grains of sand.

The moist seed of clover sends forth a single rather stout white stem with root at the apex, much after the manner of the bean, and a short distance from the seed-leaves on this root portion, after a little, appear great numbers of root hairs, and these are shorter and shorter, and are finally entirely absent as we approach the tip of the root.

When compared with clover, the root hairs of timothy are not so numerous and are longer and begin to appear close to the kernel. In other words, the portion first pushing out and away from the kernel of timothy is all of it a root, while in clover this first portion consists of a stem with a root at the lower end.

As in case of sprouting beans, the seed-coat is sometimes carried up on the seed-leaves, but it is usually left in the soil as the plantlet appears above the surface. Seedlings of clover come out of the soil in the form of a bow as did those of the bean. When first seen each seed-leaf of clover has scarcely any stem, but later the stem becomes considerably longer than would be sufficient to reach across a seed leaf. The tiny, tender, green bud is protected and covered by the stems of the seed-leaves as they are closely pressed together. The seed-leaves of the bean were seen to become smaller and withered as the young plant advanced, but those of the red clover enlarge considerably, becoming four times as long as a dry seed, usually enabling them to crowd off the seed-coat, if it happens to be carried above the soil. The seed-leaves of clover become light green and

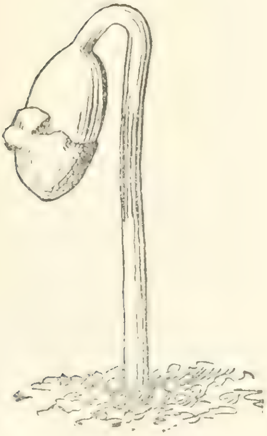

Fig. 30. Seedling of red clover as it appears above the sand.

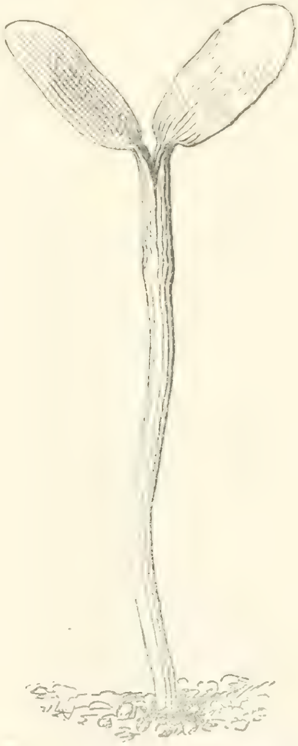

Fig. 31. Seedling of red clover with enlarged seed-leaves.

look fresh and plump. In time, if the plantlet thrive, the stems of the seed-leaves separate a little and a small, hairy leaf appears, consisting of a single folded blade, borne on a short stem. This is not accidental for all of the plants have this habit. If kept long enough in a thriving condition, the next leaf will consist of three leaflets to each leaf-stalk.

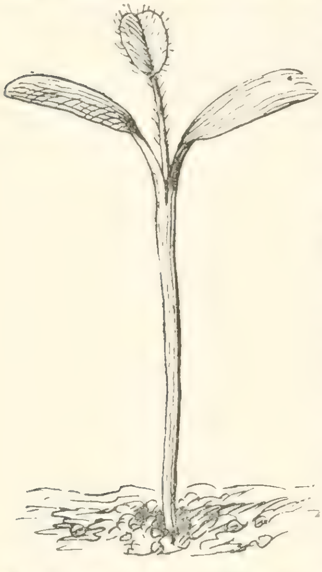

Fig. 32. Seedling of red clover displaying its first rough leaf.

When timothy and clover are sown together in a box of earth in a school room, the clover germinates first, but after the plants are up an inch or two, the timothy will be the taller. As the plants are set before a window they will slant uniformly toward the light in a most interesting manner.

Both kinds of seed will grow very well in cool weather.

As before mentioned, a grain of timothy remains on the ground or beneath the surface wherever placed, if not disturbed, and a bud is formed near the grain. These buds are hardy and likely to be protected in a way to survive inclement weather to some extent, such as frost or drouth. A young clover plant, on the contrary, thrusts up above the soil a tiny stem carrying at the top its seed-leaves and the enclosed bud. All that is left on the soil or beneath the surface will be the small roots and these are not likely to survive very dry weather or severe cold. As the roots of clover become longer and well established they contract, drawing the cluster of short branches down close to the ground or a little below the surface. These facts possibly help us to understand why clover sown in autumn is not likely to winter well where the soil is uncovered by snow.

Pupils found it impossible to induce a clover seed to sprout a second time after the sprouting seed had been thoroughly dried. After sowing seeds in the open field in March, if the weather is warm enough to induce germination, and this is followed by freezing while seeds are on the surface of the soil, they will be killed, thus accounting in some cases for the failure of a clover crop the succeeding year.

OBSERVATIONS ON THE LEAVES OF CLOVERS AT DIFFERENT TIMES OF DAY.

BY W. J. BEAL.

I suggest that you do a few very simple things regarding a few plants which are very common in the State throughout all the growing season. Look carefully at several leaves of white, red or alsike clover at eight o'clock in the morning, one and five and eight p. m., and perhaps at other hours also, in warm weather or in cold, rain or shine, noticing especially the position taken by the three leaflets of each compound leaf, making careful notes, and drawings if you can make them, for a report when called on next day or the next week. Each pupil should take pride in making his or her own observations and notes and strive to learn some points not discovered by others. Perhaps some may also at the same time of day or evening give attention to the positions taken by leaves of other plants. After pupils have made their reports to the teacher and all have done the best they can on this subject, I shall be glad to receive any of

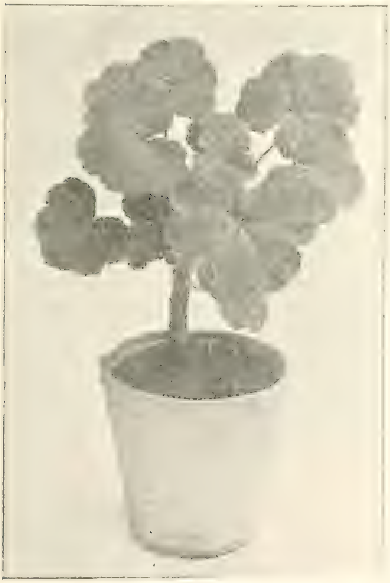

FIG. 33. A small geranium as it appeared in the south window.

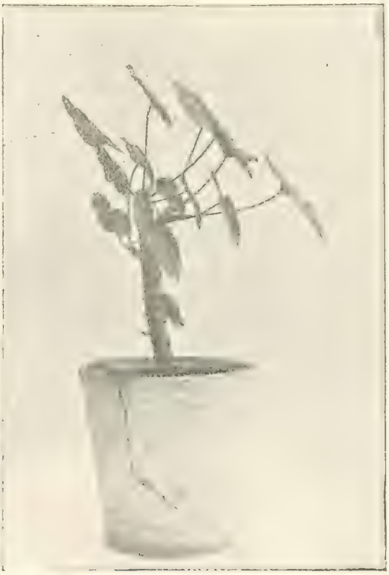

FIG. 34. The same plant as the previous one, turned half way around.

the reports the teacher thinks best to send, or a summary of them, and if any ask questions I shall do my best to answer them. Can any one tell how or why these leaflets of clover behave as they do?

As long ago as you can remember, you knew that all animals of the farm moved about of their own accord in every direction, but most likely you discovered that the plants you saw were unable to go from place to place, and you may not have thought it possible that a stem or leaf or flower should change its position while on the plant. Now that your attention has been called to it, you may remember the fact that the leaves and stems also, of a plant when placed close to a window bend toward the light, and if turned around they will bend again toward the window. They bent so slowly that you couldn't see the motion, but they really moved just as surely as the hour hand of a clock moves.

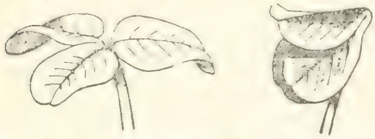

FIG 35. a. Leaf of white clover as seen in the day time. b. The same leaf as seen at night.

You have seen that the leaflets of clover repeatedly take different positions with reference to each other, even within the space of an hour or two, and perhaps you may have found out that the leaflets of some other compound leaves are able to change their positions.

You may have seen that the shape of each leaflet of clover was much the same at all times of day and night, but the very short and rather thick stem of each leaflet curved about causing the leaflet to take a different position, sometimes holding it out with one flat side toward the sun, sometimes with one edge to the sun, and usually all three leaflets of a leaf were brought snugly together on cool nights. The leaflets of some plants move upwards, some downwards, or they turn about by a slight twisting of the short stem. In many cases the leaflets move about in several directions, before getting into shape for the night or before getting back into the usual place for the day.

The botanist knows something about the structure of the stems of the leaflets of clover and knows what happens to cause the motion you have discovered, but it is rather difficult to make plain to young pupils and cannot be well explained in very simple language. We trust you may all understand it some day. Why do the leaflets get together in the cool of the day? Darwin and others found out that leaflets, if fastened by pins and kept spread out in cool nights with one side to the sky, were cooler and had more dew on them than others which crowded together. In cold nights pigs crowd together to keep warm, and so it is believed that the leaflets of clover bring themselves together to keep warm, at least to prevent getting very cool.

If the weather were very bright and hot when some of you looked at the clover, you saw that the edges of the leaflets in many cases turned more or less toward the sun. The reason for this seems to be to prevent damage to the leaflets from extreme heat falling directly onto the surface of the leaf. It also prevents a very rapid loss of moisture from the leaf.

This cuddling together after the manner of the leaflets of clover is often called the sleep of plants. Though the motion is most rapid when crowding together for the night, or when getting out in early morning for the day, still the leaflets at all times of day and night, as long as they live, are never perfectly at rest, but keep slowly jerking about, a very little at a time, even though there may be no motion of the air. The leaves of a young cabbage rise at night and fall by day, and even the thick leaves of liveforever move very slightly; in fact, many experiments convince us that all growing leaves of all plants, even in still air, slowly move in various directions all the time, day and night as long as they live.

The action of light, heat or cold on the leaves causing the short thick leaf-stems to move makes it seem as though plants had nerves and could feel somewhat as can boys and girls and all animals, but no nerves have ever been discovered.

Hereafter, all of you will know that motion to some extent, is one of the peculiarities of plants as well as of animals.

I hope you will continue looking around to discover the positions taken by all sorts of leaves, and stems, and flowers, and not let the subject drop here. Keep notes in a book and make some drawings, and above all, tell others what you discover and try to induce them to take an interest in the work.

Here are two illustrations of a few more kinds of leaves from a number of different plants; in one the leaves are represented as usually seen in the middle of a pleasant day, in the other as they appear in cool nights. These drawings are taken from *The Power of Movement in Plants* by Charles Darwin.

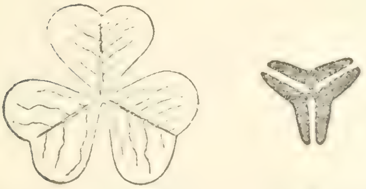

FIG. 36. a. Leaf of wood-sorrell as seen from above in the light of day.

b. The same as seen at night.

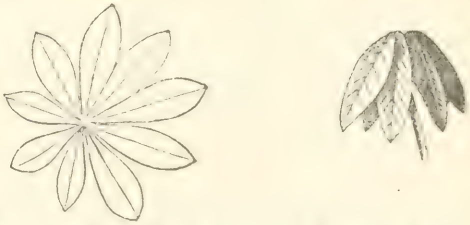

FIG. 37. a. Leaf of lupine as seen from above in daylight.

b. A side view of the same as seen at night.

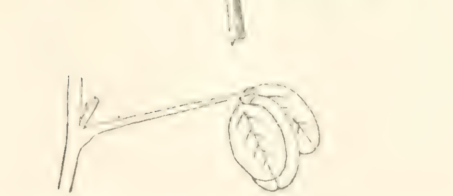

FIG. 38. a. Leaf of plant of yellow melilot as seen from above in the day time.

b. The same, inside view at night.

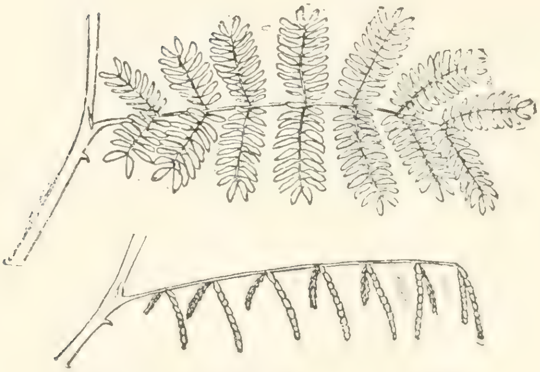

FIG. 39. a. A compound leaf of sensitive plant as seen by daylight.

b. The same leaf as seen at night.

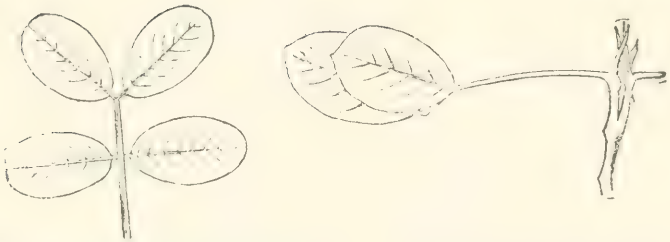

FIG. 40. a. Leaf of plant of the peanut as seen from above in the light of day.

b. The same at night in side view.

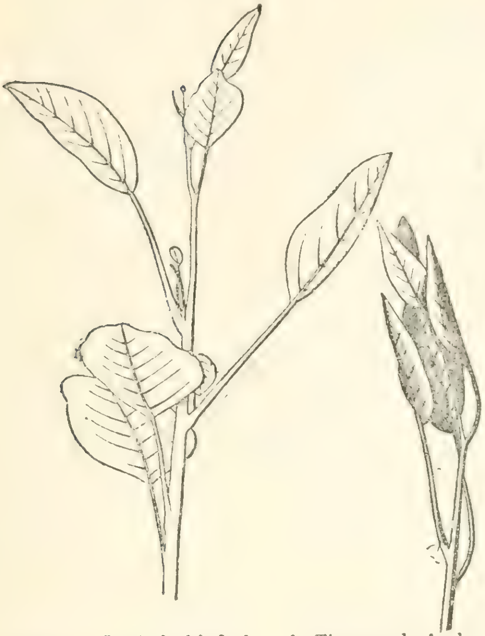

FIG. 41. a. Leaf of a kind of tobacco as seen in daytime.

b. The same leaf asleep at night.

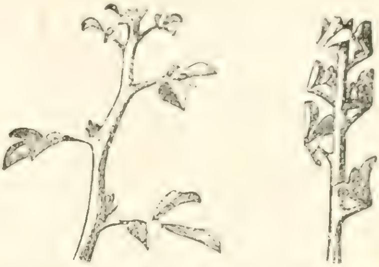

FIG. 42. a. Leaves of a plant nearly related to alfalfa or lucerne as they appear in daylight.

b. The same as seen by night.

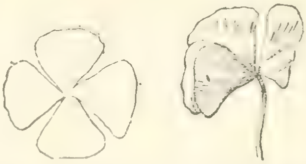

FIG 44. a. Leaf of a kind of pepperwort, *Marsilia quadrifolia*, as seen during the day.

b. As seen when beginning to go to sleep.

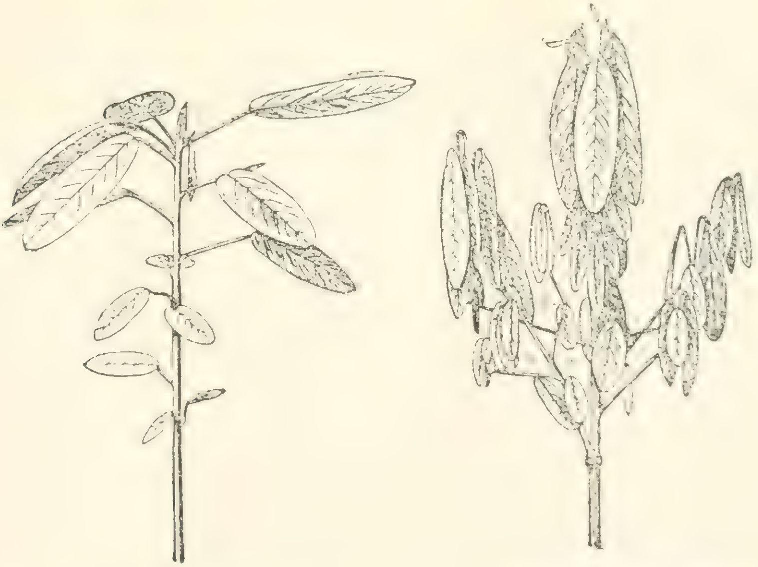

FIG. 43. a. Leaves of a foreign tropical plant, *Desmodium gyrans*, as seen during the day.

b. The same leaves as seen during night.

BULLETIN NO. 136,

NEW YORK EXPERIMENT STATION.

INSPECTION OF NURSERIES AND TREATMENT OF INFESTED NURSERY STOCK.

V. H. LOWE.

In the spring of 1896, the Maryland legislature passed a law providing that all nursery stock shipped into that state must be accompanied by a certificate. This certificate must state that the stock has been duly inspected by an authorized official and pronounced by him free from indications of the presence of dangerously injurious insects and plant diseases. It is stated that this law was for the especial purpose of protecting Maryland fruit growers from the further importation into their state of that much dreaded pest, the San José scale. Other states followed suit until seven now have similar laws and the question of similar legislation is being agitated in as many more.

Owing to this agitation and also to the fact that much has been said and written about the San José scale, its rapid work as a destroyer of fruit trees and shrubs and the ease with which it can be transported on nursery stock, Western New York nurserymen soon found themselves in a position where it was necessary to have their nurseries inspected or be seriously handicapped by the inspection laws of other states.

Although there was no evidence of an organized effort on the part of the nurserymen to have the work of inspection put upon a proper basis, the station at once undertook to accommodate them and has endeavored to do so as far as possible during the past two years.

That there will be still further need of nursery and orchard inspection in the state seems very probable. The San José scale has been found in abundance in some sections of the state and has already shown that it can thrive in western New York. The fact also that a small nursery has been found in the western part of the state and others in the southeastern in which the scale has been thriving for several years, indicates that this insect may have a much wider distribution within our borders than is at present suspected. This seems all the more probable when we reflect that just over the line in Canada the scale has been found in a number of orchards and it is known to occur in states bordering New York on the east, south and west. At present there is no law to hinder the importation of infested stock from all of these directions and no provision made for a systematic effort to prevent the further spread of this and similar pests within the state.

The insects discussed in this bulletin have been found in more or less abundance in the nurseries from time to time. All of them are readily transported on nursery stock and hence are of importance to the nurseryman as well as the fruit grower.

The problem of how best to control the numerous species of insects which attack the growing plants in the nursery is a very important one. The few experiments noted in this bulletin are incomplete, but it is expected that as opportunity is afforded they will be continued until more definite results are reached. This work will be greatly aided by the increased facilities at the station.

INSPECTION OF NURSERIES IN WESTERN NEW YORK.

METHOD OF INSPECTION.

The immediate surroundings of the nursery were first noted and any old neglected orchards bordering on the nursery, or neglected blocks of stock were first carefully examined. On several occasions neglected apple orchards or a few old neglected apple trees were found badly infested with various species of injurious insects, principally the woolly aphis. Further examinations showed that many of the nursery trees in the immediate vicinity were infested with the same species, the indications being that the insects had originally come from the old trees. After the orchard trees were examined the condition of the more immediate surroundings of the blocks, such as the fence corners, etc., were noted and any suspicious looking shrubbery subjected to a careful scrutiny. The nursery rows were next examined, the usual method being to go back and forth across the rows a number of times until the general appearance of the trees was well noted. All suspicious looking trees were, of course, carefully examined. Where possible the examination was repeated two or three times during the season.

VALUE OF INSPECTION.

It is a difficult matter to estimate the real value of nursery stock inspection. Very much depends upon the care with which the work is done. Judging from our own experience and from the work that is being done in other states, inspection which includes not only the nursery but the orchard as well, properly carried out, can be depended upon to bring to light the worst cases at least of infestation by the San José scale and other insects and plant diseases of a seriously injurious nature. Judging from our observations one of the chief benefits which has thus far resulted from nursery stock inspection in this state, is to make the growers and dealers more careful as to the condition of the stock sent out. It is probably not overestimating the value of nursery and orchard inspection to say that, properly carried out, it will be a constant stimulus to the production of clean, healthy stock, and will result in effectually holding in check such dreaded pests as the San José scale.

THOSE BENEFITED BY INSPECTION.

If inspection has a tendency to bring a better class of nursery stock on the market, then it is evident that not only the nurserymen, but all interested directly and indirectly, in the growing of trees, shrubs and vines are more or less benefited thereby. Where the inspection is extended to the orchard the benefit is much greater. Farmers should keep this in mind and note carefully the condition of the trees when they come from the nursery and watch for the development of injurious insects and diseases. In this way each farmer can be the inspector for his own premises. Nurserymen have usually considered inspection something of an annoyance, but cheerfully take the necessary steps for their own benefit and to satisfy their customers.

A GROWING DEMAND FOR INSPECTION.

As previously stated, several states have recently passed inspection laws similar to the Maryland law. Hence all nurserymen doing business in these states require certificates in order to prevent serious interference with their business. These restrictions to the trade have created a demand for nursery stock inspection which is far too great for a station entomologist to meet properly without aid if he expects to carry on his regular work. We found the demands for this kind of work so heavy during the past season that, in order to prevent a too serious interference with other duties, it was necessary to restrict our inspection for the most part to Ontario county alone. As yet no provision has been made either by state or federal law to meet this urgent demand of a highly important industry.

VARIETIES OF TREES, SHRUBS AND VINES EXAMINED.

It is not necessary to give a list here of the varieties of trees, shrubs and vines examined. It is safe to say that practically all the varieties of plants grown as nursery stock in western New York, both in the field and under glass, were examined on different occasions. By far the greater part of the stock inspected, however, consisted of the various varieties of fruit trees.

VARIETIES OF TREES MOST COMMONLY INFESTED.

These were the apple, peach and pear trees. The apple and pear trees were most commonly infested with the woolly aphis, and this pest was most often found on the Ben Davis and Yellow Transparent apples and upon the standard pears. In most cases of infested pear trees, the blocks were next to blocks of infested apples, the indications being that the insects had come from the apples to the pears. The peach trees were infested with the peach-tree borer.

SPECIES OF INSECTS INCLUDED IN THIS REPORT.

Only the more important species which are readily transferred on nursery stock are included in this report. No account is taken of the large number of species which attack the stock during the growing season but which do not remain on the trees after the leaves are taken off and hence are not readily scattered over the country by means of nursery stock.

For convenience the species herein discussed may be grouped under four heads as follows:

I. Insects which secrete or otherwise produce a scale-like covering .... Scale Insects, including the oyster-shell bark-louse, scurfy bark-louse, the New York plum lecanium, the oak scale and the San José scale.

II. Insects which secrete honey dew or a bluish-white flocculent substance .... Plant Lice, including the wooly aphis of the apple.

III. Insects which bore into the tree...................... Borers, including the peach-tree borer.

IV. Insects which feed on the buds and leaves and which hibernate on the twigs in protective cases......................... Case-Bearers, including the pistol-case-bearer and the cigar-case-bearer. Although not a true case-bearing insect the bud moth may for convenience be included under this head.

SCALE INSECTS.

Scale insects are among the most common of the insect pests. The group includes a large number of species. As destructive insects they rank among the first and are to be dreaded, not only because of the great injury which they can inflict, but because most species are very hard to eradicate from a nursery or an orchard after they have once become well established. As a rule, however, scale insects need not become abundant in the nursery if the stock is carefully watched and the first few trees found infested are either treated or burned. The most important species found are discussed in detail as follows:

THE OYSTER SHELL BARK-LOUSE.

Mytilaspis pomorum Bouché.

This insect is so commonly found in the orchard that it is liable to be considered of little importance. It is less harmful than many other scale insects, yet it is capable of doing very serious injury, especially in the young orchard, and for this reason should be considered an important pest in the nursery, even though the nursery trees themselves do not usually become badly infested.

History.—But little is known of the early history of this species. According to our best authorities it is undoubtedly of European origin but was introduced very early into this country. It was first described in 1738 by a Frenchman named Reaumer who found specimens on an elm in his native country. According to Dr. Howard* it was known in this country as early as 1794.

The earliest account which we have seen relating to the insect in this state was published by Dr. Asa Fitch in 1856 in his first report as State Entomologist (p. 31). Dr. Fitch states that the insect was then known "everywhere throughout the northern states * * * infesting the orchards to a grievous extent, causing the death of many trees and impairing the health and vigor of many more." The same writer quotes a Wisconsin correspondent who states that the insect was evidently introduced into Wisconsin as early as 1840. It is thus shown that the species had a wide distribution in this country at an early date.

Present distribution.—The oyster-shell bark-louse is known all over the world. It occurs in more or less abundance wherever apples and pears are grown. In the United States it is reported from Maine to California, although it is not so well known in many of the western states as in the east and south. It is widely distributed throughout this state. While we are receiving specimens from new localities every year, up to the present time specimens have been received from the following counties: Erie, Niagara, Monroe, Wayne, Ontario, Yates, Schuyler, Seneca, Cayuga, Onondaga, Cortland, Jefferson, Lewis, St. Lawrence, Columbia, Kings, Queens and Suffolk.

Food plants.—The list of food plants for this insect includes a large number of our common trees and shrubs. In the nursery it is especially abundant upon fruit trees, such as apple and pear, but it should be watched for on other stock such as currant, gooseberry, blackberry and raspberry, also on ornamentals such as maple, birch, elm and lilac.

Descriptions and life history.—The life history of the oyster-shell bark-louse is very similar to that of many other species of scale insects. If an infested tree is examined in the winter the scales will be found to present the appearance shown in Plate I, fig. 1, which is from a photograph of an infested apple twig, natural size. It will be observed that although differing in shape, being longer and narrower, the scales bear a slight resemblance to an oyster-shell, hence the name. If one or two of these scales are turned over [Fig. 2] they will be found to be well filled with creamy white eggs. If, however, the eggs are not observed until nearly ready to hatch they will have turned to a dark reddish-brown color. There are usually between forty and fifty although the number may vary greatly. We have found as few as thirty and more than sixty under different scales. The shriveled body of the female scale will be found occupying a portion of the smaller end. The eggs vary in shape as shown at Fig. 3, which is from a photomicrograph showing a number of the eggs greatly enlarged, but in general appearance slightly resemble miniature hen's eggs. They also vary in size, but from a number of measurements we found that an egg of average size would measure about 0.3 mm. by 0.18 mm.

The eggs remain protected by the scales all winter. In this climate most of them have hatched by the first of June. In some seasons they hatch earlier than others. Last year many newly hatched lice were observed on apple trees in the vicinity of the station as early as May 7.

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* Year Book U. S. Dept. Agr. 1894, p. 255.

The newly hatched lice are very small, measuring only about 0.4 mm. in length and half as broad. A good idea of their shape is given in Plate II, fig. 1, *c*. Their bodies are nearly flat and light yellow in color. They wander about for a short time, varying from a few hours to a day or more, finally settling down, most of them on the new growth, where they begin to suck the sap by means of their sharp, thread-like mouth parts. They probably never go to the leaves and only one or two cases have been reported where the scales were found on the fruit. It is probable that when once settled on the bark the females never move.

The scales grow rapidly and by the latter part of July are mature. Most of the scales grow to have the appearance already referred to and shown at Plate I, fig. 1. These are the female scales and they are in a very large majority. The male scales are much smaller and more regular in outline. The posterior portion of the scale is also very different in that it is hinged so as to allow the mature male to escape.

In color, the male and female scales are similar, both finally becoming an ash gray tint. The mature male is a delicate two-winged insect very different in appearance from the female. A mature male is shown in Plate II, fig. 1, *a*, and a mature female, with her scale removed, at *e*.

The eggs are laid during the middle of the summer, the body of the female growing smaller as each one is produced until finally there is little left but a withered skin. The eggs remain under the scales all winter, finally hatching in the spring as previously stated.

Means of distribution.—As the scale passes the fall, winter, and part of the spring in the egg state, the eggs being protected by the scales, it is evident that the insect may be easily distributed by means of infested stock. When the trees are not badly infested the scales are easily overlooked, and thus as each scale protects thirty or forty eggs, a nursery tree even slightly infested may finally harbor enough scales to do very serious injury in the orchard.

Remedial measures.—Badly infested nursery trees should be dug up and burned. Where especially choice trees or shrubs are infested they may be successfully treated either by applying a wash during the winter or by spraying in the spring while the young lice are active. For a winter wash either kerosene emulsion or whale oil soap may be used. The kerosene emulsion should be diluted with three parts of water, and the whale oil soap* used at a strength of one pound to two gallons of water.

Before applying the wash the infested parts should either be scraped gently or rubbed with a stiff scrubbing brush to loosen the scales. This allows the insecticide to reach the eggs which would otherwise be protected by the scales. For spring treatment, spray the trees as soon as the young lice appear. Either kerosene emulsion or whale oil soap solution may be used. The former should be diluted with seven parts of water and the latter used at a strength of one pound to seven gallons of water.

Where practical the winter treatment is preferable, as many of the young scales may be easily missed. In case of badly infested trees, however, both the winter and spring treatment may be given with excellent effect.

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*In buying whale oil soap much pains should be taken to get a good article. Much of the soap on the market is very poor. The Leggett brand has proven of good quality, also that manufactured by Jas. Good, Philadelphia, Pa.

THE SCURFY BARK-LOUSE.

Chionaspis furfurus Fitch.

Like the oyster-shell bark-louse this species occasionally becomes sufficiently abundant to do serious injury. We have seen it in the nursery as often as the other species and have found it doing very serious injury in at least one large pear orchard in the state.

History.—Although this species is less frequently mentioned in the writings of early American entomologists it was well known at an early date as an injurious species. B. D. Walsh and other writers on American entomology mentioned it as early as 1860. Since that time it has been frequently mentioned by American writers.

Present distribution.—According to Dr. Howard* this species is now known to occur in the District of Columbia, and twenty states, including Massachusetts on the east, Georgia on the south and southern California on the west. The same writer also states that it has been recently reported in England. It is undoubtedly widely distributed in this state. Up to this date we have received specimens from Erie, Niagara, Monroe, Wayne, Ontario, Yates, Schuyler, Seneca, Cayuga, Onondaga, Columbia, Queens and Suffolk counties.

Food plants—The most common food plants for the scurfy bark-louse are apple and pear. In the nurseries we have found it more abundant on pear trees than on any other stock. In one instance nearly all the trees in a small block of standard pears were very badly infested, a majority of them being seriously injured. We have found it upon apple, pear, crab apple and quince. In addition to these food plants Dr. Howard† gives black cherry, choke cherry, currant, mountain ash, Japan quince and peach, the last named having been sent from two localities in Georgia.

Descriptions and life history.—The general appearance of the mature female scales is shown in Plate I, fig. 4, which is from a photograph of an infested pear twig. They are dirty white in color. The life history of this species is very similar to that of the oyster-shell bark-louse. The eggs are found under the scales during the winter, but usually in less numbers than in the preceding species; also instead of being cream white, they are purplish red. The young scales hatch in the spring at about the time the young oyster-shell bark-lice appear, which they resemble very closely. The male scales are much larger than the female scales and, unlike them, are brilliant white. They are also quite different in shape, the sides being nearly parallel with two longitudinal ridges extending along the upper surface.

Means of distribution.—This insect is distributed by means of infested nursery stock in the same manner as the preceding species. Owing to their lighter color, however, they are more easily seen and hence there is less excuse for sending out infested stock.

Remedial measures.—The treatment recommended for the oyster-shell bark-louse will prove equally effective for this insect.

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*Year Book U. S. Dept. Agr. 1894, p. 259.

†Year Book U. S. Dept. Agr. 1894, p. 260.

THE NEW YORK PLUM LECANIUM.

Lecanium cerasifex [*]Fitch (?).

The sudden appearance of this insect three years ago in overwhelming numbers in some of the large plum orchards of western New York, is doubtless fresh in the memory of orchardists and nurserymen throughout the state. Very little is heard of this scale now, however, owing to the fact that it disappeared almost as suddenly as it came. But it may still be seen occasionally in most plum orchards, and during the past season we found it scattered in several nurseries, hence it may yet be considered a pest which should be carefully watched with a view to preventing other serious outbreaks.

History.—Previous to 1893 but little was known of this insect in this state although it seems to be the prevailing opinion among prominent fruit growers that the insect has been in the plum orchards of Western New York for twenty years or more but not in sufficient numbers to cause special comment. During the seasons of 1893 and 1894 the insect did great damage to western New York plum orchards, but in the spring of 1895, comparatively few of the scales could be found, most of them having succumbed to the attacks of parasites, predaceous insects and climatic changes.

Present distribution.—Accurate data as to the present distribution of this insect is wanting. This, or a very similar species, however, is known in the south, and a species which is probably identical is reported from England. Judging from our observations during the past season, the scale is at present scattered through many of the larger plum orchards in western New York and may be occasionally seen in the nurseries, but in only a few cases have we found it in sufficient numbers to do serious injury. We have observed the species in the following counties: Niagara, Orleans, Genesee, Monroe, Ontario, Seneca, Cayuga, Onondaga, Richmond and Queens.

Food plants.—As its name indicates, this species is especially injurious to the plum. It has also been reported upon apple, pear, maple, *Cissus*, cherry and peach. In addition to these food plants the writer has found a very closely allied, if not identical, species upon quince, apricot, cultivated blackberry, cultivated grape, honey locust, black ash, and iron wood [*Ostryia.*]

Descriptions and life history.—A detailed account of this insect is given in the Fourteenth Annual Report of this Station, pages 574-593. As comparatively few of the reports are left for distribution, however, it may be well to repeat the life history of the insect substantially as given therein.

The general appearance of the insect is shown at Plate I, fig. 5. At *a* the mature scales are shown enlarged, and at *b* the mature and young hibernating scales, natural size. Unlike the two preceding species, this scale passes the winter in the larval state. After the first few warm days of spring, the young scales begin to move about, but soon find a suitable place to settle down to again suck the sap of their host plant. They soon begin to grow with astonishing rapidity. Previous to this time the male and female scales are very much alike, but as the season advances, the female scales are seen to grow to large oval fleshy scales, while the males are much smaller, oblong and slightly oval in shape. A delicate white waxy scale is their only protection. The mature male is a delicate two-winged insect, in general appearance resembling the males of the two preceding species. Under this delicate covering the male undergoes its transformations, finally, about the time the females become full grown, emerging as a mature insect.

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[*] Identified by Mr. Th. Pergande.

About the middle of May or early in June the females are mature and egg laying begins. The eggs are oblong oval in shape, pearly white and have smooth shells. They are laid under the mother shell, which is only the hardened integument of the parent insect, the mother scale herself literally turning into a mass of eggs. The number of eggs produced by a single scale varies greatly, probably from five or six hundred to over two thousand, the writer having counted over twenty-one hundred under a single female.

The newly hatched scales remain under the mother shells for a time varying from a few hours to two or three days. At this time they vary in size from 0.5 to 0.75 mm. in length and are a little more than half as broad as long. Their bodies are also very thin and slightly curved above.

As would be supposed, a swarm of little scales is produced from a single mother. After leaving the mother shell they travel about apparently aimlessly for a time, but within a few days settle down, most of them upon the under surface of the leaves along the mid-ribs and larger veins, although many may be found upon the upper surface as well. Still others, however, may be found scattered about promiscuously on both surfaces of the leaves and it is not unusual to find some that have remained behind on the new and tender twigs. When attacking the leaves of the quince, they seem to prefer the upper surface, for out of a large number of quince leaves examined only an occasional scale could be found on the under surfaces, while the upper surfaces were moderately infested. It should be remembered that these young scales are very small at this time and as they closely resemble the leaf in color and are almost semi-transparent, they are easily overlooked. Hence in examining the leaves for them it is well to use a small magnifying glass.

The scales grow slowly during the summer and gradually change to a dark, reddish brown color. During all of this time, however, they suck the sap vigorously and secrete much honey dew, causing the leaves, branches and fruit to become sticky and unsightly.

During the latter part of August or early in September the young scales migrate to the twigs and branches and even the trunk to seek shelter for the winter. On badly infested trees they may frequently be found overlapping one another and in sheltered places, as in crevices in the bark it is not unusual to find them two or three deep. In this condition they remain until spring when activity is again renewed and the life cycle completed.

Means of distribution.—The hibernating scales are easily carried about on nursery stock. Young nursery trees probably seldom become badly infested. All of the infested trees which we have seen had but comparatively few scales on them and these were scattered about on the trunks and branches and were usually hidden in scars on the trunks and near the buds so effectually that they were easily overlooked. Thus the young scales, although not protected by a scaly covering, are not easily rubbed off and hence may remain on trees shipped long distances without injury.

Remedial measures.—In the report above referred to we have given a detailed account of a series of experiments with kerosene emulsion as a remedy for this species. It was found that kerosene emulsion diluted with from four to six parts of water could be depended upon to kill the hibernating scales when applied to the infested trees in the form of a spray. When the spray is to be directed against the newly hatched lice, the emulsion should not be diluted with more than nine parts of water.

THE OAK SCALE.

Asterodiaspis quercicola Bouché.

There are but few references to this insect in the writings of American entomologists. In his report for 1880, p. 330, Prof. J. H. Comstock, who was then Entomologist of the United States Department of Agriculture, published a description of the male and female, the former being taken from Signoret. Another reference is in Insect Life, Vol II, p. 41, in which Dr. L. O. Howard states that this scale is found almost solely upon American oaks in a grove in the Department grounds, previously referred to by Prof. Comstock in his report for 1880. In Insect Life, Vol. VII, p. 120, Mr. C. L. Marlett gives the result of experiments against this insect. He found that the newly hatched young could be killed by spraying the infested trees with kerosene emulsion, 1 part to 13 parts of water. In the same volume, page 428, a brief reference is made to a note by Mr. R. Newstead in the Entomologist's Monthly Magazine for April, 1895, in which he states that, although birds are not usually supposed to feed on scale insects, he had found that the blue tit and longtailed tit feed on this and certain other species.

It is probable that, except in isolated cases, the species has never been a serious pest in this country.

As its name implies this scale attacts the oak. Some idea of its general appearance can be had by referring to Plate I, fig. 6. This figure is from a photograph of an infested twig, natural size. The female scales are nearly circular and somewhat conical. They are dark or yellowish green in color. When one of the mature scales is removed, it will be found to have made a pit-like depression in bark. The mature female scales will measure from 1 mm. to nearly 2 mm. in diameter. According to Signoret, as quoted by Comstock, the male scales are oval and usually smaller than the females, measuring but 1 mm. in length. But little is known of the life history of this species.

We have seldom found this scale in the nursery. It may do serious injury on large trees, however. A good illustration of this is on one of the principal streets of Geneva, where most of the English oaks, *Quercus robar*, which line the streets for two or three blocks on either side, have been either killed or nearly so by this scale. So far as we know its only food plant is the oak.

THE SAN JOSÉ SCALE.

Aspidiotus perniciosus Comst.

At present this is the most important of all the species of insects which attack nursery stock. It is most important, not only because of the injury to the trees which it is capable of doing, but because nursery men and fruit growers are afraid of it and hence hesitate to buy stock from a nursery in a locality where the scale is known to exist. It is also of especial interest to nursery men and fruit growers in this state because it is being found each season in new localities within our borders. The finding of the scale in a small nursery near Union Springs probably means that it has been sent to numerous localities within the state. Much has been written about it and it has been described and its life history written over and over again. Yet a very large majority of the nurserymen and fruit growers of the state seem to have but little idea of the true nature of the insect. It may be well, therefore, to give a somewhat detailed account of it in these pages.

History.—The original home of the San José scale is not positively known. Some writers think that it originally came from South America, while others believe that its native home may have been Japan or possibly Australia. But wherever its original home may have been it is said to have been known in the San José Valley, California, as early as 1870. In 1880 Prof. J. H. Comstock described it and gave it its scientific name. It was not discovered in the east until 1893, when a few trees in an orchard at Charlottesville, Va., were found infested. Subsequent investigations showed that these trees came originally from a New Jersey nursery. In 1894 the scale was found on Long Island and other points in this state.

Present distribution.—According to Messrs. Howard and Marlatt* the scale was known in 1896 in Alabama, Arizona, California, Delaware, Florida, Georgia, Idaho, Indiana, Louisiana, Massachusetts, Maryland, New Jersey, New York, New Mexico, Ohio, Oregon, Pennsylvania, Virginia, Washington, West Virginia and British Columbia. In addition to the above states it is now known to occur in several localities in Michigan and in the provinces of Canada. In this state it has been found in the following counties: Suffolk, in several orchards; Queens, in three nurseries; Kings, in one small orchard near Brooklyn; Orange, in an orchard at New Milford (Dr. Lintner); Dutchess, in an orchard near Poughkeepsie; Columbia, in an orchard near Germantown and two at Kinderhook; Tompkins, on ornamentals on the campus of Cornell University; Seneca, two trees, which have been burned, in an orchard near Farmer; Cayuga, in an old nursery near Union Springs.

Food plants.—The following list of food plants, which includes those observed up to 1896, is given by Dr. J. B. Smith.† It will be of especial interest to nurserymen and hence is given here in full. Linden, euonymus, almond, peach, apricot, plum, cherry, locust, spiræa, raspberry, blackberry, rose, hawthorne, cotoneaster, pear, apple, quince, flowering quince, gooseberry, currant, flowering currant, persimmon, acacia, elm, osage orange, English walnut, pecan, hickory, alder, chestnut, oak, birch, weeping willow, laurel leaved willow, Kilmarnock willow, sumach and grape. A list published in July, 1897, by Prof. F. M. Webster[*] includes black walnut, Carolina poplar, lombardy poplar, golden leaf poplar, European willow, cut leaf birch, flowering peach, flowering cherry, American linden, European linden, hardy catalpa and mountain ash in addition to those given above.

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*U. S. Dept. Agr. Div. Ent. Bul. 3, new series.

†N. J. Agl. Exp. Stas. Rept. 1896, p. 547.

From the above lists it will be seen that the scale may be found on practically all classes of nursery stock grown in the east. It is not known to attack citrus fruits.

Descriptions and life history.—A good idea of the general appearance of the scale is given in Plate III, figs. 1 to 4. Here the scales are shown natural size and enlarged on both twigs and fruit. The female scales are greatly in excess of the males, which is the case with most other scale insects. The following description is taken from Bul. 3 (new series), U. S. Department of Agriculture Division of Entomology, by Howard and Marlatt, p. 46: "The scale of the female is circular, very slightly raised centrally, and varies in diameter from 1 to 2 mm., averaging about 1.4 mm. The exuviæ is central or nearly so. The large well-developed scales are gray, excepting the central part covering the exuviæ, which varies from pale to reddish yellow, although in some cases dark colored. The scale is usually smooth exteriorly or sometimes slightly annulated, and the limits of the larval scale are always plainly marked. The natural color of the scale is frequently obscured by the presence of the sooty fungus [*Fumago salicina*].

The microscopic characteristics of the mature female are shown in Plate II, Fig. 2. At *b* the ornamentation of the anal plate is shown. This is of especial value in determining the species. Those who wish to make microscopical examination of the insect to determine the species, will find that the characteristics of the anal plate can be brought out by boiling the insect for a few minutes in a weak solution of caustic potash, then washing, then, after placing in alcohol for a short time, cleansing in oil of cloves or other convenient cleaning solution. The specimen should then be mounted in balsam. The *male scale* is darker than the female scale, "oblong oval" in shape, "nearly twice as long as wide and about half the diameter of the female scale." (Howard and Marlatt). The mature male is a delicate two-winged insect, orange yellow in color, excepting the head, which is somewhat darker.

The main points of the insect's life history may be briefly stated as follows:—In this climate, if an infested tree is examined during the winter the scales will be found varying in size from less than half grown to fully matured. On badly infested trees they are crowded in great numbers very close together. On trees not badly infested they will be found in groups of from two to three to many more, with numerous individuals scattered about on the bark. The writer has not had an opportunity of studying the life history of the scale in western New York until within the past few weeks, and hence no observations have been made as to the time the females first begin producing young in the spring. On long island, however, the males mature in April and during the following month the females begin giving birth to young. Unlike most scale insects, the young are brought forth, in nearly all cases, alive. According to Howard and Marlatt the average number of young pro-

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[†] Ohio Agl. Exp. Sta. Bul. 81, p. 184.

duced by a single female is 400. The period during which an individual female will continue producing young lasts for six or seven weeks. The newly born scales are nearly microscopic in size, with bodies oval in shape, when viewed from above, and orange yellow in color. They remain under the mother scale for a short time, finally coming forth to wander about until a suitable place is found to insert their sharp thread-like setæ, by means of which they suck the sap. By this time thread-like, waxy secretions have begun to appear on the back of each little scale. These waxy secretions, together with the cast skins, form the scales. At first there is no difference in appearance between the male and female scales, but according to Howard and Marlatt* the difference becomes apparent after the first molt. Owing to the comparatively long period during which young are produced it is difficult to ascertain the number of generations. Judging from the scales, as they appear in the winter, however, it is probable that young are produced until the latter part of the summer or early in the fall. After all their young have been brought forth the old females die, the young surviving to continue the species.

Means of distribution.—Locally the active scales are undoubtedly carried about by birds, insects, such as beetles, and probably on the clothing of persons working in the infested nursery or orchard. An illustration of this was noticed in one of the nurseries previously referred to. In this nursery it is evident that the scales were first introduced on a few trees. These are very badly infested, those in their immediate vicinity less so, and those four or five rods away still less. Along the road bordering this nursery and about forty rods away are a dozen or more pear trees which have been in bearing about two years. These are healthy, vigorous trees and are only very slightly infested, having evidently become infested within the past year. It seems very probable that the only way the scales could have been brought to these trees was by some of the means above referred to.

It is undoubtedly safe to say that the scale is sent broadcast over the country by means of nursery stock more than in any other way. It is true that infested pears from California have frequently been found on fruit stands in some of our eastern cities, but there is very much less chance of spreading the scale in this way than by infested nursery stock. Infested trees dug either in the fall or spring will carry dormant scales.

Remedial measures.—Various insecticides have been tested in the east against this insect. Eight of the most important of these are discussed in Bulletin No. 87 of this Station. The insecticide which has proved the most successful in the east is whale oil soap. This should be applied at least twice to the infested trees in the fall after the leaves have fallen, at a strength of two pounds to a gallon of water. Another application should be made in the spring before the buds begin to swell. A portion of an infested plum orchard which was carefully sprayed with whale oil soap at this strength was practically freed from the scale after two applications. It is important to have good whale oil soap. That manufactured by Legget Bros., 301 Pearl street, New York, and by James Good, 514-518 Hurst street, Philadelphia, is highly recommended. Dr.

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*U. S, Dept. Agr. Div. Ent. Bul. 3, new series, p. 46.

J. B. Smith* recommends a fish oil soap which can be made after the following formula:

Concentrated lye	3½ pounds
Water	7½ gallons
Fish oil	1 gallon

The lye should be dissolved in boiling water and the fish oil at once added. This mixture should be kept boiling for two hours and then allowed to cool. This soap should be used at a strength of one pound to one gallon of water.

Pure kerosene oil has been used as a winter application with varying degrees of success. It will kill all the scales with which it comes in contact, but unless the tree is very hardy or the conditions are just right it is liable to kill the tree also. It should not be used except in extreme cases.

When the trees or nursery stock are to be fumigated with hydrocyanic acid gas, the gas may be generated after the following formula:

Fused cyanide of potassium [98 per cent]	1 oz.
Sulphuric acid, commercial	1 oz.
Water	3 ozs.

Pour the water and the sulphuric acid into a glass or glazed earthenware dish. When this is placed where it is to remain add the cyanide of potassium. This will generate enough gas for 150 cubic feet of space. Much care should be taken that the operator does not breathe any of the fumes.

Fumigation is not considered the most practical method of treatment for infested orchard trees here in the east, but it may be used for infested nursery stock. On another page reference is made to treating nursery stock in large cellars. A convenient house for fumigating a small amount of nursery stock is shown at Plate IV. These may be built any convenient size. They are built of a double thickness of boards with building paper between to make them as nearly air tight as can be conveniently done. The door is made to fit very tight. The stock is piled in the house in such a manner as to allow the gas to circulate freely. One generator with enough material to fill the space is placed about the middle of the floor, and as soon as the cyanide is added, the door is shut and the stock left for an hour. When the fumigating is done on a cool, cloudy day, or at night, there is practically no danger of injuring the stock as shown by the fact that various varieties of fruit trees, also currants and gooseberries, have been exposed in the building shown in the plate and in others in their immediate vicinity, all night without the least apparent injury.

A closely allied species common in New York.—This insect *Aspidiotus ancylus* Putn., resembles the San José scale in general appearance and is frequently mistaken for it. It is not a serious pest in this state, however, but in the south it may occur in sufficient numbers to do serious injury to the infested plants. Its life history has not been worked out for this locality.

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*N. J. Agr. Exp. Stas. Rept. 1896, p. 559.

We have frequently found this species in the nursery, usually on young plum trees, but in no instance were the scales in sufficient numbers to injure the trees to an appreciable extent.

According to Prof. T. D. A. Cockerell,* this scale is found upon ash, maple, beach, linden, oak, osage orange, peach, hackberry, bladder nut and water locust.

PLANT LICE.

The nature of these insects in general need not be enlarged upon here, as the principal points in their development will be touched upon in another bulletin. These insects were unusually abundant last year in both nurseries and orchards. One of the species *Hyalopterus pruni*, which was abundant on the plum last season is shown at Plate VI, fig. 5. This species was also very abundant in some of the nurseries examined last season, but will be discussed more in detail in the bulletin above referred to.

THE WOOLLY LOUSE OF THE APPLE.

Schizoneura lanigera Hausm.

The writer has found this species more common in New York nurseries than any of the other injurious insects. As a rule apple trees were the worst infested, but blocks of pears or quince trees growing next to blocks of infested apples, were also usually infested.

The life history and habits of this insect, together with its importance as a nursery stock pest, are discussed by the writer in the Annual Report of the station for 1895, pages 570-577, and hence it will be unnecessary to discuss these points in detail here. It may be stated, however, that in some sections of the state this species of woolly aphis is doing very serious injury every year, both in the nurseries and young orchards. The insect and its work are illustrated at Plate V, figs. 1 to 5. All of the photographs for this plate were made from an infested apple tree taken from a nursery at Geneva. The insect works on both roots and branches. Those infesting the former are referred to as the root inhabiting form and those on the branches as the aerial form. The injury to the roots caused by the lice is shown at Fig. 3. The larger roots are more or less deformed and are covered with galls. A nearer view of some of the galls is shown at Fig. 4. Fig. 1 shows the appearance of a badly infested twig. The lice collect on the under sides of the limbs and twigs and secrete a bluish white cottony substance which completely covers them. If these lice are removed it will be found that they have formed numerous galls and pits on the bark. At Fig. 2 one of these galls and some of the lice, with most of the cottony substance removed, are shown enlarged to about four times natural size.

The lice are distributed in the nursery or orchard by means of the migrating females, but they are distributed over the country by means of infested nursery stock. Many trees with infested roots are shipped, but the lice are frequently found in the scars along the trunks of the young trees, as shown at Fig. 5. The lice hibernate in these scars and other similar places on the trees. The winter eggs may also be frequently found among these hibernating lice. In a large majority of cases the infested trees found on the packing grounds during the past two seasons by the writer, were harboring the lice in these scars on the trunks only, very few of them having infested roots. It is important that nurserymen and buyers take pains to avoid selling or planting stock thus infested. The lice can be easily and quickly killed by touching these infested scars with a cloth saturated with kerosene oil.

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*U. S. Dept. Agr. Div. Ent. Bul. No. 6, technical series, p. 20.

This insect is widely distributed throughout the United States and is well known in Europe. It is probably found in this state wherever apples are grown. Our records show that it has been either observed by the writer in injurious numbers or reported to the Station from the following counties: Chautauqua, Monroe, Wayne, Ontario, Yates, Seneca, Cayuga, Columbia, Dutchess, Queens and Suffolk.

BORERS.

This group includes a number of the most serious pests in nursery and orchard trees. By "borers" is usually meant those insects which bore into the roots, trunks or branches of the infested plant. As the larvæ are most active in the injurious work the term refers especially to them. The only species of borer which was found doing serious injury in the nurseries is the peach tree borer.

THE PEACH TREE BORER.

Sannina exitiosa, Say.

This insect is also discussed at length in the Annual Report of this Station for 1896, pp. 559-567, and hence need be only briefly mentioned here.

The nature of the insect is shown at Plate VI, figs. 1 to 3. The injury is done by the larvæ, which bore into the trunk or roots, feeding largely on the sapwood. One of the larvæ is shown at Fig. 1. At Fig. 2 the pupa (*a*) and male (*b*) and female (*c*) moths are shown. Both figures are from photographs showing the originals natural size. At Fig. 3 an upper and side view of one of the larvæ slightly enlarged is shown.

In some sections of the state this insect is usually very abundant. The borers were much less frequently found the past season than the season previous.

This insect has also a wide distribution and is well known in all parts of the state. We have found it especially abundant in Monroe, Wayne, Ontario, Seneca and Cayuga counties.

CASE BEARING INSECTS.

Under this head may be included two species of insects which have done serious injury in the nurseries and orchards, especially the latter, in this state during the past two seasons. These are commonly known as the pistol-case-bearer and the cigar-case-bearer. They are called case-bearers because the caterpillars construct cases for themselves which they carry on their backs and which serve as protection to the owners.

THE PISTOL-CASE-BEARER.

Coleophora malivorella Riley.

This insect should receive the careful attention of both nurserymen and fruit growers, as it is becoming a very serious pest. It is especially injurious to the apple and pear and is known to attack the quince. The principal injury is done to the buds and expanding leaves. The young caterpillars construct pistol shaped cases soon after hatching. They hibernate in these and during the winter the cases may be seen attached to the twigs, as shown at Plate VI, fig. 4. The case-bearers are more noticeable during the spring or early summer, as their cases are much larger and their injurious work more apparent. This insect is discussed in detail in Bulletin No. 122 of this Station.

The pistol-case-bearer is probably distributed over a considerable area in the eastern states. It is especially injurious in the apple orchards of Western New York. The writer has observed it in seriously injurious numbers in some of the large orchards in Orleans, Monroe, Wayne, Ontario and Seneca counties.

CIGAR-CASE-BEARER.

Coleophora fletcherella Fernald.

A closely allied species is the cigar-case-bearer. The case of the mature caterpillar resembles a miniature cigar, hence the name. The writer has not observed this species in the nursery as frequently as the other, but it is well known as a serious pest in the apple orchards, especially in the western part of the state. The hibernating case-bearers of this species are not as easily detected as those of the other. Their cases are smaller, usually a little lighter colored and bent in the shape of a half moon. They are usually found close beside the winter buds or partially hidden in a fold in the bark or the angle made by a branching twig. It is as widely distributed as the former species and is found on the same food plants.

THE BUD MOTH.

Tmetocera ocellana Schif.

Although not a case-bearing insect the discussion of this species may be placed here for convenience.

History.—This species is probably of European origin. It was known as a serious pest in this country nearly fifty years ago. Since then it has been recorded as a serious pest in various parts of the eastern states.

Present distribution.—It is probably well distributed throughout the eastern states. It is also well known in Canada. It has been found in Missouri and as far west as Idaho.

Food plants.—The writer has observed this insect upon apple, pear, plum and peach trees. According to Prof. M. V. Slingerland*, who has made a careful study of this species, it also attacks the cherry, quince and blackberry.

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*Cornell Univ. Agl. Exp. Sta. Bul. 107, p. 57.

Description and life history.—The life history of this insect has not been studied out by the writer. As given by Prof. Slingerland, in the bulletin above referred to, it is briefly as follows:—Usually the nurseryman or fruit grower is not aware that this insect is injuring his trees until he finds that many of the leaf buds fail to produce leaves in the spring. Upon examination the little brown caterpillars may be found eating out the tender centers of the swelling buds. Later in the season they attack the unfolding leaves, drawing them together with silken threads, as shown at Plate VI, fig. 6. By June the caterpillars are full grown. The pupa stage is passed in these nests, "in a tube of dead leaves," and lasts about ten days. The parent insects are dark ash gray moths, marked with a cream white band across the front wings. In three or four days after emerging the moths lay their eggs. The eggs resemble minute drops of water and are laid singly or in clusters on the leaves. The eggs hatch in from seven to ten days. The young caterpillars soon begin to feed on the skin of the leaf. They also make for themselves tubes of silk usually along the midrib of the leaf. They continue to feed during July and part of August, devouring only the soft parts of the leaf. During August the caterpillars migrate to the twigs, where they spin silken cases on which to pass the winter. These cases are about one-eighth of an inch long and as they lie close to the bark and resemble it in color, are not readily detected.

The writer has quite frequently found these cases with their hibernating caterpillars on nursery trees about to be shipped from the packing grounds. It is in this manner that the insect is most readily distributed over the country.

Remedial measures.—Where practicable the trees should be thoroughly sprayed with Paris green, 1 pound to 150 gallons of water, before the buds open in the spring. Two applications will be found better than one, the object being to keep the buds coated with the poison, so that the first meal of the caterpillars in the spring will be a poisoned one. Experiments at this station have shown that the bud moth can be held in check in this way.

In nurseries, and in orchards also, serious injury may be prevented by cutting out the nests, which are rendered conspicuous by the partially dead leaves. This should be done before the moths come forth, thus reducing the numbers of the next brood.

EXPERIMENTS IN TREATING INFESTED NURSERY STOCK.

DIPPING YOUNG STOCK INFESTED WITH PLANT LICE.

As noted on a previous page, plant lice have been unusually abundant during the past season. Their injurious work has been especially evident in the nurseries. The greatest injury was usually caused to seedling and one-year-old fruit trees. The lice attacked the tender leaves at the tips of the young trees, soon causing them to curl so badly that the insects could not be reached with a spray. In the nursery in which the experiments were made the infested trees, principally sweet cherry, apple and pear trees, showed serious injury from the effects of the lice. The experiments were undertaken with a view to detrmining a practical method of checking the injurious work of the lice. It was evident that spraying would not be a success and so dipping the infested trees in a solution of whale oil soap and water was resorted to. It might at first seem that this method would be impractical because of the time and labor involved, but it should be remembered that the lice appear on comparatively few trees first, others becoming infested from these later in the season, and hence if they are successfully treated more serious injury by the lice may be prevented.

All of the trees used in the experiments were seedlings, one-year-olds and two-year-olds. As the lice were congregated on the leaves at the tips it was necessary to wet only this portion of the tree. The dipping of the stock was found to be a very simple matter. Three or four men carrying pails filled with the solution passed through the blocks and, picking out the infested trees, bent them over carefully and dipped their tips into the solution, taking care to hold them long enough to wet all of the lice. It was found unnecessary to spend more than two minutes to a tree.

Experiments.—About a thousand trees were used in experiments, which for convenience may be divided into six blocks. Blocks I and II were sweet cherries badly infested with the black cherry apis, *Myzus cerasi.* Blocks III and IV were apples also badly infested, but with the apple apis, *Aphis mali.* Blocks V and VI were standard pears infested with a species of plant lice, *Aphis* sp. Blocks I, III, and V were treated the same day, a bright, warm day about the middle of July, with a solution of whale oil soap, 1 pound to 3 gallons of water. Blocks II, IV, and VI were treated within two days of this time, under practically the same weather conditions, with a solution of whale oil soap, 1 pound to 7 gallons of water. But one application was made in each case.

Results.—In nearly every case where the stronger soap solution, 1 pound to 3 gallons, was used, the leaves were more or less injured. The pears were injured most, while there was not much difference between the apples and cherries. So far as could be ascertained, all of the lice on these trees were killed. The weaker solution, 1 pound to 7 gallons, did not injure the foliage in any instance, but proved fully as effectual as the stronger solution in killing the lice. These treated trees were not seriously infested again during the season.

Conclusions.—The above experiments indicate that when young nursery trees become so badly infested with plant lice as to make spraying impractical, they may be successfully treated by dipping the curled tips in a solution of whale oil soap, 1 pound to 7 gallons of water. The expense and labor were so slight as to be factors of but little importance. When thoroughly done but one treatment is necessary under ordinary circumstances.

SPRAYING YOUNG GRAFTS.

Most of these experiments were conducted against a large species of flea beetle, *Systena hudsonias* Forst. The beetles were very abundant during June and July on apple and pear grafts in a nursery near the station. The beetles fed voraciously on both upper and under surfaces of the leaves, eating away the tender tissue and causing them to wither and die. About twenty-five per cent. of the grafts were killed before the experiments were commenced and a whole block of 20,000 apple grafts was seriously threatened. The beetles were also doing serious injury in a small block of two-year-old apples and a larger block of two-year-old pears in the same nursery. Green arsenite was used in all the experiments and in each case sufficient lime was used to make the mixture "milky" in appearance. A barrel and pump, mounted on a small stone-boat, which could be easily hauled between the rows by one horse, was used. To each lead of hose a Y was attached so as to support two short lengths of hose. Two men followed the pump, spraying two rows at a time, thus requiring three men to do the work. Improved Vermorel nozzles were used.

Experiments.—Block I; one-year-old apple grafts sprayed June 16, with green arsenite, 1 pound to 150 gallons of water. June 18 this block was again sprayed, but the poison was used at a strength of 1 pound to 100 gallons of water. June 25 a third application was made, the poison being used at the same strength.

Block II; two-year-old apple trees sprayed June 18 and again June 25, with green arsenite, 1 pound to 100 gallons of water.

Block III; two-year-old pear trees sprayed June 18 and again June 25, with green arsenite as in Block II.

Block IV; one-year-old apple grafts badly infested with canker worms. This block was sprayed early in June with the green arsenite, 1 pound to 100 gallons of water. A second application of the poison was unnecessary.

Results.—The green arsenite at 1 pound to 150 gallons of water had but little effect on the beetles. Where the stronger mixture was applied the effect was very apparent, after the second application. But few live beetles could be found, and after the third application no further injury to the stock was noticed. Although most of the spraying was done on a bright warm day, the most tender leaves did not show the slightest indications of having been burned by the green arsenite.

Block IV was freed from canker worms by one application of the poison at the strength stated.

Conclusions.—While these experiments should be carried further before final conclusions are reached, the results indicate that young grafts may be safely sprayed with the green arsenite, 1 pound to 100 gallons of water, provided enough lime is added to give the mixture a "milky" appearance. It may be here stated that it is important to add the lime.

as it not only makes the mixture spread and adhere to the leaf better, but prevents burning the foliage.

SPRAYING CUT-LEAVED BIRCH.

These trees constituted a small block in one of the Geneva nurseries. Nearly all of the trees were badly infested with thrips [*Thrips* sp.]. These are very small, almost microscopic insects, which feed on the soft-parts of the leaves, soon causing them to wither and die. They are frequently very injurious, and are well known to both gardeners and fruit growers. They are hard to reach with insecticides, as they fly away as soon as disturbed by the spray mixture. The trees in question were beginning to show the injury which the insects were causing before the spraying was done. In all cases much pains was taken to wet both upper and under surfaces of the leaves.

Experiments.—About the middle of June the block was sprayed with a solution of whale oil soap, 1 pound to 7 gallons of water. After waiting two days no beneficial results were apparent. The block was again sprayed with whale oil soap, 1 pound to 4 gallons of water. This had the effect of keeping the insects away for a few days, but injured the foliage slightly during one or two warm bright days which followed the application of the soap. In about six days from this last application the trees were again sprayed, this time with whale oil soap, 1 pound to 7 gallons of water, with the addition of flowers of sulphur, 1 oz. to each gallon of solution. This proved much more effectual than either of the other applications. Another application of the soap solution with the sulphur added was made a week later. Although this species of thrips continued abundant throughout the season on other ornamentals in the immediate vicinity of the block of birch, no further injury of a serious nature resulted to the sprayed trees.

Conclusions.—These experiments indicate that thrips can be held in check by a whale oil soap solution, 1 pound to 7 gallons of water, with the addition of 1 oz. of flowers of sulphur to each gallon of the solution, when attacking trees similar to the cut leaved birch. It should be remembered that it is important that the leaves should be drenched on both upper and under surfaces.

EXPERIMENTS IN FUMIGATING NURSERY STOCK.

These experiments have only just begun and hence require but brief mention here. Fumigating nursery stock is usually done for the purpose of killing San José scale. If fumigation can be made practical in the large cellars used by nurserymen, it will be an inexpensive way to treat a large amount of stock, and a preventive to the spread, not only of San José scale, but other insects, such as woolly aphis, bud moth, pistol-case-bearer and other injurious species. Experiments along this line are being conducted in the insectary at the station and in one of the large frost-proof cellars of the Chase Nursery Co., at Rochester. The cellar is 80 ft. long, 40 ft. wide and 16 ft. high. This was filled with fruit trees of all varieties and fumigated with hydrocyanic acid gas. Before the gas was generated, twigs infested with the woolly aphis and the pistol-case-bearer were placed in different parts of the cellar, including the remotest parts and under some of the piles of trees. The trees were exposed all night, 14 hours. The temperature in the cellar was a little above freezing. The twigs were carefully examined and all of the lice were dead.

The pistol-case-bearers are apparently dead, but are being kept in the insectary awaiting results when it becomes time for them to revive.

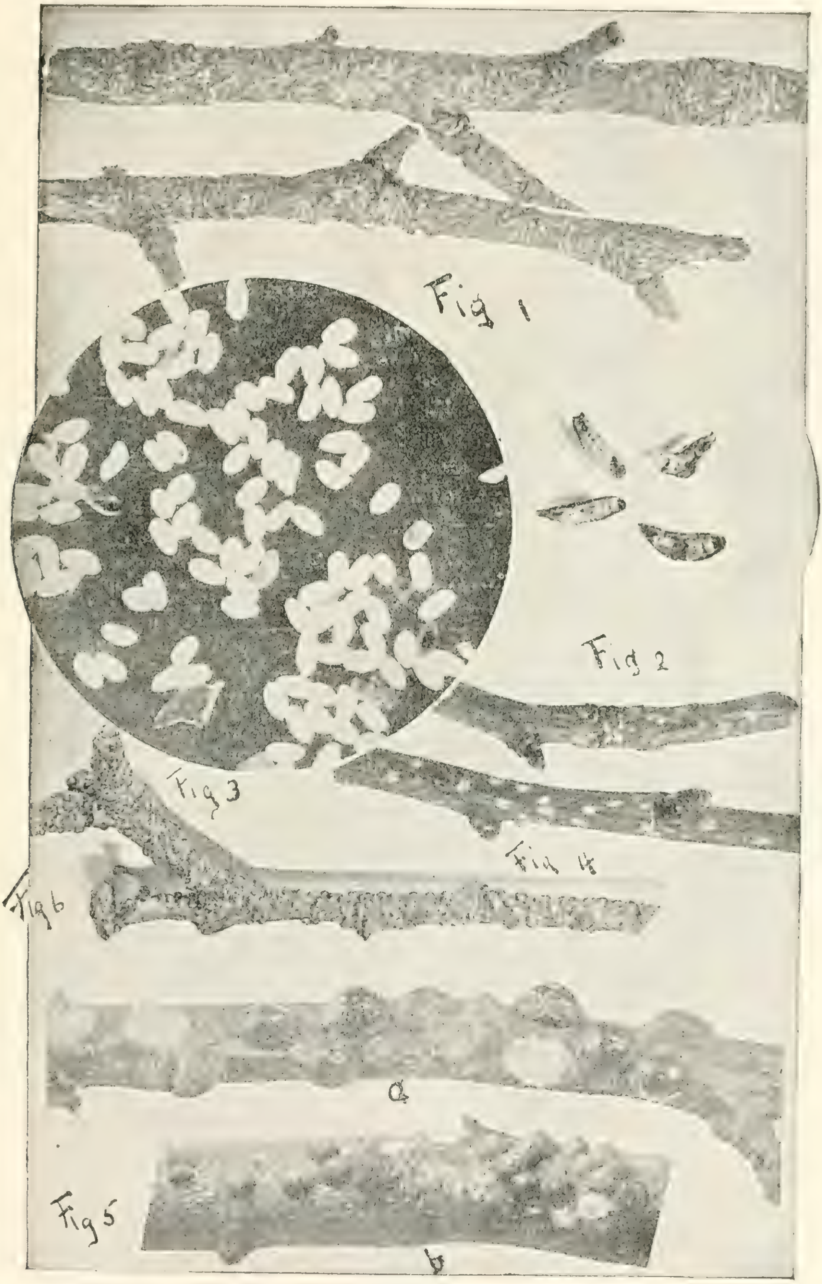

Plate I.

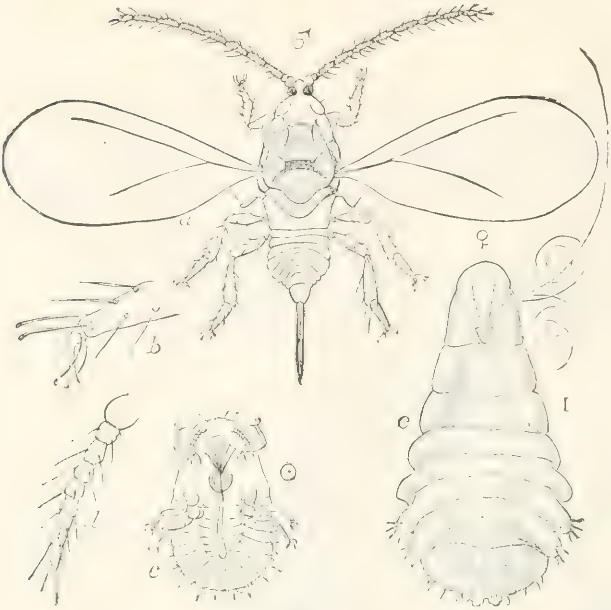

Fig. 1.

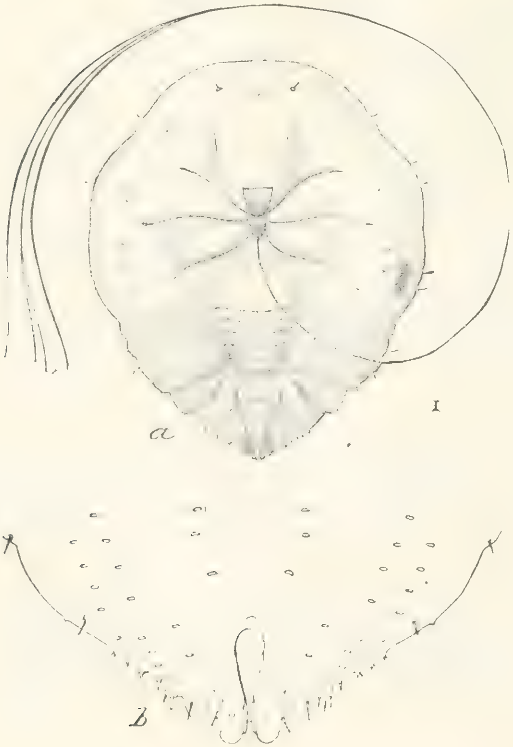

Fig. 2.

PLATE II.

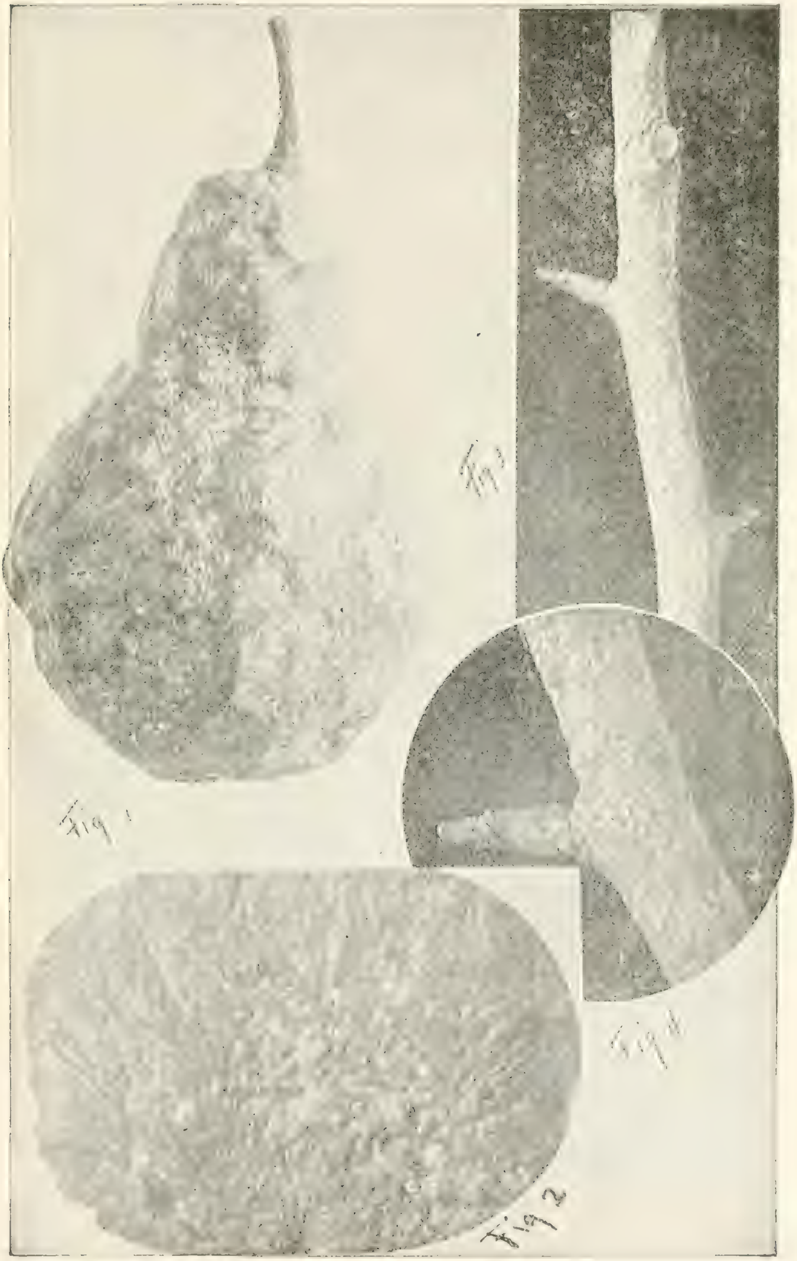

PLATE III.

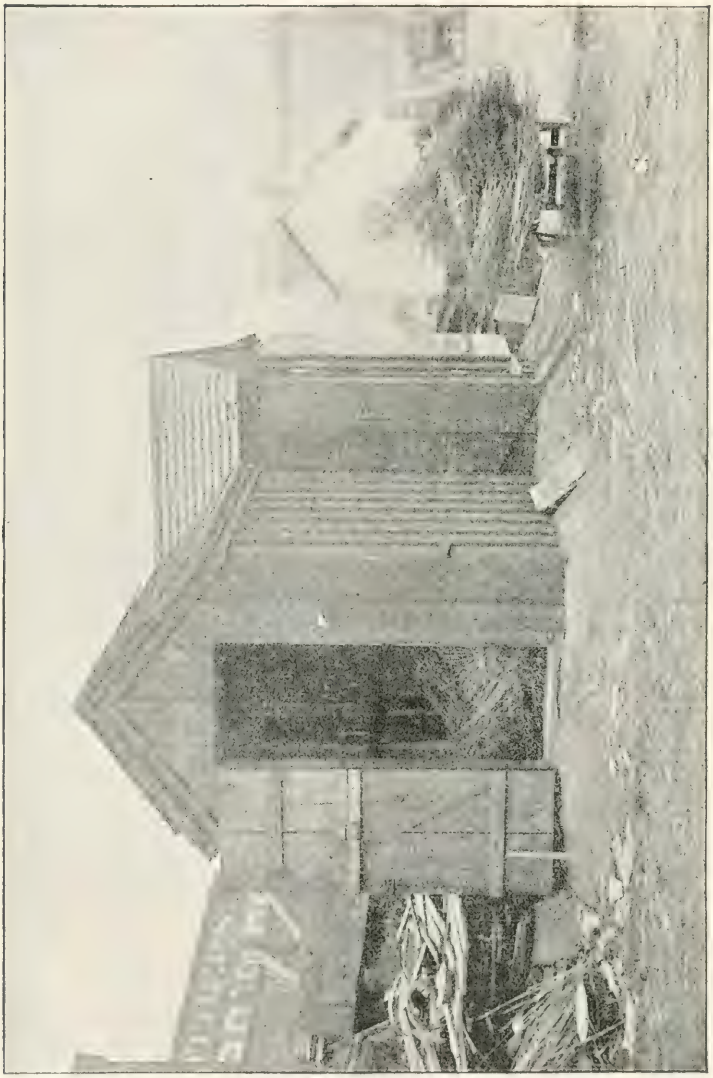

PLATE IV

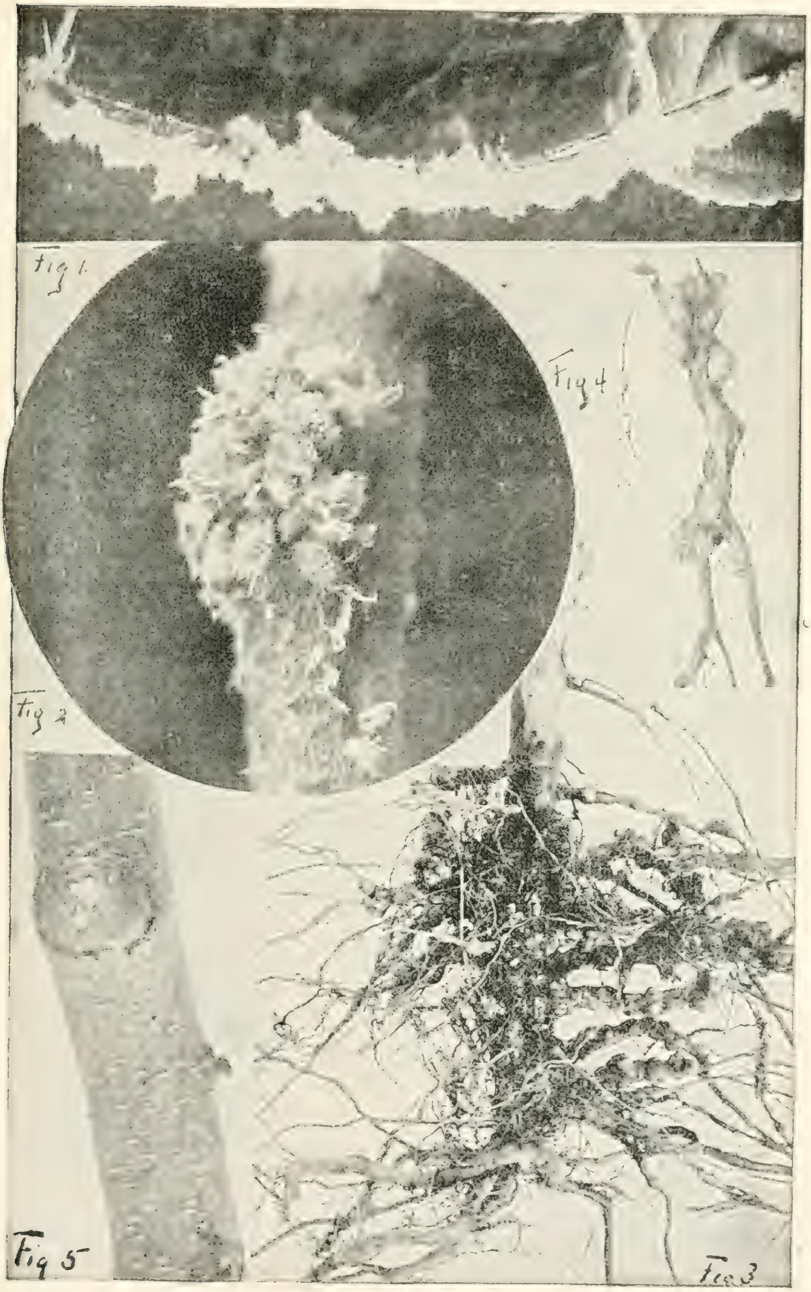

PLATE V.

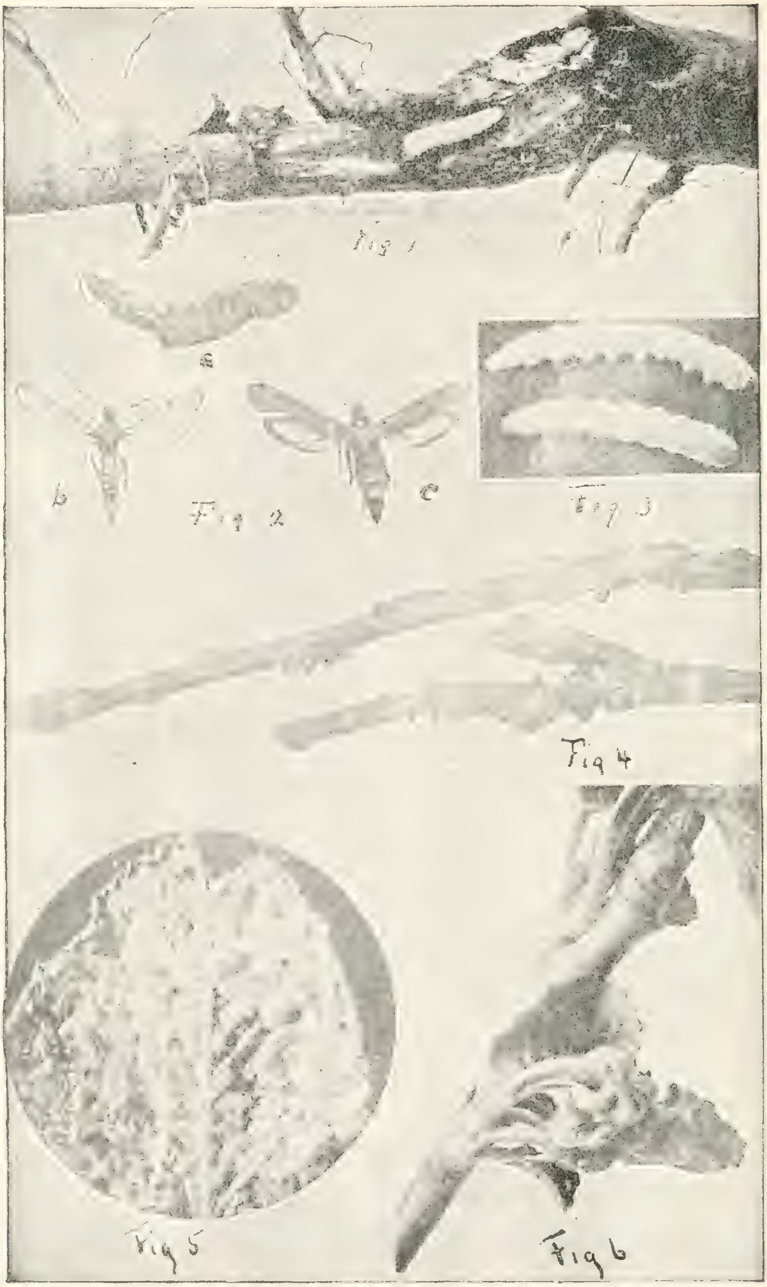

PLATE VI.

EXPLANATION OF PLATES.

PLATE I.—Fig. 1, the oyster-shell bark-louse, natural size; 2, view of under surface of some of the scales showing eggs, enlarged; 3, photomicrograph of some of the eggs; 4, scurfy bark-louse, natural size; 5, plum lecanium, a, enlarged, b, natural size; 6, the oak scale, natural size.

PLATE II.—Fig. 1, the oyster-shell bark-louse; a, adult male; b, foot of same; c, young larva; d, antenna of same; e, adult female taken from scale—a, c, e, greatly enlarged; b, d, still more enlarged.

Fig. 2, the San José scale, adult female before development of eggs; a, ventral view, showing very long sucking setæ; b, anal plate, showing characteristic ornamentation of edge—greatly enlarged.

(L. O. Howard and C. L. Marlatt, United States Department of Agriculture, Division of Entomology.)

PLATE III.—The San José scale; Fig. 1, infested pear [Duchess d' Angouleme]; 2, portion of the pear enlarged showing scales about four times natural size; 3, infested pear twig, natural size; 4, section of same, enlarged.

PLATE IV.—Small house for fumigating nursery stock.

PLATE V.—The woolly louse of the apple. Fig. 1, infested apple twig, natural size; 2, section of the same twig enlarged showing gall and lice; 3, roots of young apple showing galls made by the lice; 4, some of the galls, natural size; 5, scar on trunk of young apple tree in which lice have congregated.

PLATE VI.—Fig. 1, plum root showing work of peach tree borer; 2, a, pupa case with chrysalis emerging; b and c, male and female moths; 3, larva, two views. [Fig. 2, natural size; Fig. 3 slightly enlarged. From photographs, by Mr. F. A. Sirrine.] 4, pistol-case-bearers hibernating on apple twig, natural size; 5, plant lice, *Haylopterus pruni*, on under surface of plum leaf, enlarged; 6, young apple leaves drawn together by larva of bud moth.

FRUIT CATALOGUE, 1898-9.

ARRANGEMENT OF THE CATALOGUE.

The same plan of arrangement has been followed in this as in previous catalogues and no radical changes have been made. With few exceptions the explanations given for the last catalogue can be used in this one.

Many of the varieties that have heretofore been included in the catalogues, have been rejected as the trees are not grown by any of the nurserymen and but to little extent in any of the orchards, so that it would be almost impossible to obtain either trees or scions. Many of the varieties that have been carried in the lists have now been tested sufficiently to show that they are of less value than many of the other kinds, and so have been placed in the rejected list, while many of those that were new and promising kinds, have, after two or more years of trial, proved themselves worthy of general planting, and the starring has been changed accordingly. Many of the new sorts that have recently been brought out, but that have not been sufficiently tested to determine their value, have also been added to the list. By these changes we have endeavored to bring the list down to date and to make it of greater value to growers and prospective planters of trees.

It will be noticed that each variety has been given a number in the column at the left and that this is repeated on the opposite page to prevent mistakes in carrying the variety across. In the columns devoted to the description of the varieties we have made use of the usual abbreviations, the explanations for which will be found at the head of each section. The columns headed "Use and Value" show, on a scale of 1 to 10, the value of the fruits for different purposes but it should be observed that in the sub-columns headed "Dessert" and "Cooking" the quality of the fruit and its adaptation to the purpose alone are considered, without regard to the productiveness, or other characteristics, of the varieties. On the other hand, in the column under "Market," the qualities that go to make the variety valuable for the market are considered; including color, productiveness, size, etc. If the variety stands high in the "Market" column and has either the "Dessert" or "Cooking" qualities sufficiently developed to bring the total of the two columns up to fifteen or over, it indicates that it is especially valuable for that purpose, whether for home use or for market.

It often happens that a variety does not prove equally valuable in all parts of the state and for this kind the columns under locality are arranged to show by means of symbols their value in different sections.

When two stars (**) are given it indicates that the variety is very generally successful in that locality and that it is one of the most desirable kinds for planting, but if only one star (*) is used, it shows, that while the variety has much merit, it will be less valuable under ordinary conditions than those of the first class; there are also many sorts that, while they do well in some locations, are not generally successful, and for the particular section will be of less value than those that are given under one star; these we have marked with a star followed by an interrogation point (*?) to indicate that they are at best of doubtful value, or that they should be only planted where they have been tested and found to succeed. There are also many varieties that are of even less value and as they have been found profitable in some locations and for some purposes, they have been included in the list, but the columns which show their value in different sections of the state have been left blank. We have also included in the list quite a number of the new sorts that seem promising and have marked each of them with a dagger (†); while these have been planted experimentally they have not been sufficiently tested to warrant their use on a large scale.

In dividing the state into districts for the sub-columns under "Locality", we have followed the previous lists and have grouped the counties of the Lower Peninsula into sections as follows: First district, "East", the eastern tier of counties; second, "Center", the central counties of the state, omitting the row of counties along the east, south and west sides; third district, "South", counties along the south side excepting Lenawee and Cass; fourth district, the counties bordering Lake Michigan from Berrien to Muskegon inclusive; fifth district, from Muskegon northward along the shore. In reality the eastern district does not extend much above Bay county, although many of the hardier fruits can be grown with success even to the north of Alpena, while the central district cannot be relied upon for the tender fruits for the counties north of Gratiot.

NOMENCLATURE.

The nomenclature used in this revision is in accordance with the "Rules of Pomology" of the American Pomological Society, and several changes have been made that bring the list in harmony with the names recommended by the Division of Pomology of the Department of Agriculture.

In preparing this list, errors have without doubt crept in and, that they may be corrected in future lists, any person who notices any rating that is incorrect for a given locality is urged to inform the writer.

L. R. TAFT,

Chairman of Committee on Revision of Catalogue.

AGRICULTURAL COLLEGE, MICH.,

April 5, 1898.

FRUIT CATALOGUE FOR 1898 AND 1899.

ABBREVIATIONS, APPLICABLE THROUGHOUT THE CATALOGUE.

Size.	Quality.	Adhesion.
l. large.	b. best.	c. cling.
m. medium.	g. good.	f. free.
s. small.	v. very.	
v. very.		

SECTION I.—APPLES.

ABBREVIATIONS FOR THIS SECTION.

Form.

a. angular,
c. conical.
f. flattened.
l. lop-sided or oblique.
o. oblong.
ob. oblate or obtuse.
ov. oval or ovate.
r. roundish.

Number.	Names.	Description.						Use and value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Alexander	v l	r c	g y r	g	Oct. Dec.	Rus.	2	10	6
2	American Golden Russet	s	r ov	y ru	b	Oct. Jan.	Am.	9	6	2
3	Antonovka	l	r ob	w y	g	Sept.	Rus.	6	8	7
4	Autumn Bough	m	c a	y	v g	Aug. Oct.	Am.	5	5	3
5	Autumn Swaar	l	r c	o y ru	v g	Sept.	Am.	7	7	4
6	Bailey, *Sweet*	l	r c	y d r	v g	Nov. Mar.	N. Y.?	6	7	4
7	Baldwin	l	r c	y cr o	v g	Nov. Mar.	Mass.	7	9	10
8	Belmont	m	r f c	y v	v g	Nov. Mar.	Penn.	9	6	6
9	Ben Davis	m l	r c	y r	g	Dec. May.	Ken.?	3	5	9
10	Benoni	m s	r ob c	y d c	v g	Aug. Sept.	Mass.	7	6	5
11	Bietigheimer	v l	ob	r g y	g	Oct.	Rus.	6	8	8
12	Black Gilliflower	m	o c	g d r	g	Nov. Feb.	Am.	4	2	4
13	Blenheim	l	r ob c	y o d r	g	Oct. Dec.	Eng.	5	7	6
14	Bough, *Sweet* *Large Yellow Bough.*	l	o ov	g y r	v g	Aug.	Am.	8	7	6
15	Broadwell	m	ob c	y b	v g	Nov. Feb.	Ohio.	7	7	4
16	Buckingham	m l	ob c	g y cr	v g	Nov. Feb.	Vir.?	6	5	5
17	Buffington	m	ob	y w r	v g	Aug.	Penn.	7	5	3
18	Chenango	m l	o c	w c	v g	Sept. Oct.	N. Y.	9	7	8
19	Clyde	l	r c a	g r	g	Oct. Jan.	N. Y.	5	5	6
20	Cogswell	m l	r ob	y r	b	Dec. Mar.	Conn.	8	7	8
21	Cole Quince	l	r ob	g y r	v g	Oct. Dec.	Maine.	6	8	6
22	Colvert	l	ob c	g y r	g	Oct. Nov.	N. Y.?	4	7	7
23	Cooper	l	r ob	g y r	g	Oct. Dec.	Am.?	4	6	7
24	Cooper Market	m	ob c	y r c	g	Dec. May.	Am.?	4	6	6
25	Cornell	m	o c	y c	v g	Oct. Nov.	Penn.	7	6	6
26	Cranberry Pippin	m	r ob	y s	g	Nov. Mar.	N. Y.	5	7	6
27	Danvers, *Sweet*	m	r o	y o	v g	Nov. Apr.	Mass.	5	7	5
28	Domine	m	r ob	g y r	v g	Dec. Apr.	Am.?	6	6	6
29	Dyer, *Pomme Royal*	m	r	g y r	b	Sept. Oct.	Fr.?	8	6	4
30	Early Harvest	m	r ob	y w	b	July Aug.	N. Y.?	7	7	5

FRUIT CATALOGUE FOR 1898 AND 1899.

ABBREVIATIONS APPLICABLE THROUGHOUT THE CATALOGUE

Season.		Origin.	
The usual abbreviations for months.	b. beginning. e. end. m. middle.	The usual abbreviations for countries.	h. hybrid. ? doubtful.

SECTION I.—APPLES.

Color.

b. brown.	o. orange.	v. vermillion.
c. carmine.	p. purplish.	w. whitish.
cr. crimson.	r. red.	y. yellow.
d. dark.	ru. russet.	
g. green.	s. scarlet.	

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore.	Northern lake shore.	
1	*	*	*	*	*	Tree vigorous, spreading, productive; very beautiful. For cooking superior.
2	....	..				Better farther south. Tree upright. Fruit often scabby and worthless.
3	†	†	†	†	†	Productive. Handsome. Promising.
4	*	....	..		*	One of the best dessert sweet apples of the season.
5	*?	*?	*?	*?	..	Hardy, vigorous, spreading. Excellent, but not productive enough for the market.
6	*	**	*	*	*	For vigor, productiveness, size, beauty and quality combined, this has few if any superiors.
7	**	**	**	**	*	Tree lacks hardiness. Fruit drops badly. Bitter rot in large specimens. Stands first on light soils in southern Michigan.
8	*	*	*	*	*	Fruit often defective in this climate. Best for home markets. Suits the popular taste.
9	*	**	*	**	*	Vigorous, hardy, prolific. Fruit beautiful and handles well, but very poor in quality. Sells well in the market.
10	*?	*?	*	*	*?	Tree upright, vigorous, very productive. Fruit too small on old trees.
11	*	**	*	*	**	Large and handsome; generally productive and a good cooking sort.
12			....	....	....	Very mild flavor. Soon gets dry and mealy. Prized by a very few persons.
13	*?	*?	*?	*?	...	In vigor and productiveness, also character of fruit, this is very desirable for market and cooking.
14	*	**	*	*	*	Tree a little tender and lacks productiveness. The most popular early sweet apple.
15	*	*	*	*	*	Vigorous, hardy, spreading, irregular, productive. A desirable sweet apple.
16	*?	*?	*?	*?	*?	Little grown here. More popular farther south.
17	*?	*?	*?	*?	*?	A desirable dessert apple. Not as generally known as it deserves to be.
18	**	**	**	**	*	Tree, vigorous, spreading, productive. Fruit of very delicate texture. Popular wherever known.
19	*?	*?	*?	*?	....	Tree vigorous, upright, very productive. A desirable market apple.
20	*?	*?	*?	*?	...	The tree and fruit are both satisfactory, whether for the home or market.
21	*	*?	*?	*?		Upright, spreading, productive. A desirable family fruit with quince aroma.
22	*?	*?	*?	*?	*?	Tree vigorous, hardy, prolific. Fruit, large, showy, but not of high quality. Popular with the masses. Sells well in market.
23			....		....	Tree very vigorous, upright, spreading. Fruit even sized, very attractive.
24	*?	*?	*?	*?	*?	Hardy, vigorous, upright, productive. Profitable.
25	*?	*?	*?	*?	*?	Vigorous, productive. A desirable fruit for general purposes.
26	*?	*?	*?	*?	..	Tree a good grower, productive. Fruit much like the Maiden Blush. Even more beautiful. Worthless at the extreme north.
27	*	*	*	*		Strong grower and very productive. Deserves more attention.
28	*?	*?	*?	*?	*?	Tree has long, stout, spreading branches, which are very liable to be broken by the heavy crops of fruit. Scabs on old trees.
29	*?	*?	*?	*?	....	One of the very finest dessert apple. A poor grower. Unprofitable as a market fruit.
30	*	*	*	*	*	Tardy, irregular bearer. Fruit often imperfect. Valued mainly for its earliness. Fails on old trees.

SECTION I.—APPLES.—Continued.

Number.	Names.	Description.						Use and value Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
31	Early Joe	s	ob c	y r	b	Aug. Sept	N. Y.	8	6	4
32	Early Strawberry	s	r c	y r	v g	July Aug.	N. Y.	8	6	7
33	English Russet	s m	r c	g y ru	g	Jan. May.	Am.?	4	5	6
34	Esopus	m	o c	y r	b	Dec. Apr.	N. Y.	7	8	4
35	Fallawater	v l	r c	y g r	g	Nov. Mar.	Penn.	4	7	7
36	Fall Jenneting	l	ob c	g y r	g	Sept. Oct.	Conn?	5	4	4
37	Fall Orange	l	r	y r	g	Oct. Nov.	Mass.	4	8	8
38	Fall Pippin	v l	r f	y g b	b	Oct. Dec.	Am.	8	9	7
39	Fall Wine	m	r ob	r y	b	Sept. Nov.	Am.	7	6	4
40	Fameuse, *Snow*	m	r ob	g y r	v g	Oct. Nov.	Can.?	9	6	7
41	Flushing	m	r c	g y r	g	Nov. Mar.	N. Y.?	6	6	7
42	Gano	l	r c	y r s	g	Nov. Mar.	Mo.	5	6	9
43	Garden Royal	m s	r ob c	g y r	b	Aug. Sept.	Mass.	9	5	4
44	Garrettson	m	r c	y	v g	Sept.	N. J.	6	6	6
45	Genesee	l	r c	w cr	g	Sept.	Am.	6	6	5
46	Gideon	m l	r c	y	g	Nov. Dec.	Minn.	5	8	7
47	Golden Russet (W. N. Y.)	m s	r ob	y ru	v g	Dec. May.	Eng.?	9	6	8
48	Golden Sweet	l	r	g y	g	Aug. Sept.	Conn.	6	5	6
49	Golding (*Am. Golden Pippin*)	m l	r ob c	y b	v g	Nov. Feb.	Am.	7	7	5
50	Good Peasant	m	o c	y r	g	Oct. Dec.	Rus.	7	9	9
51	Gravenstein	l	r ob a	y r o	v g	Sept. Oct.	Ger.	7	7	8
52	Green Sweet	m	r ob c	g y	g	Dec. Mar.	Mass.?	7	6	7
53	Grimes, *Golden*	m	r o c	y o	v g	Dec. Mar.	Va.	9	7	8
54	Hartford, *Sweet*	l	r f	y g r	g	Dec. June.	Conn.	6	7	4
55	Haskell, *Sweet*	m l	ob	g y r	v g	Sept. Oct.	Mass.	6	7	2
56	Hawley, *Dowse*	l	r o c	y	v g	Sept.	N. Y.	7	5	5
57	Hawthornden	m l	r f	w y r	g	Sept.	Scotch.	3	8	8
58	Hightop, *Sweet*	m s	r	y	v g	Aug.	Mass.	6	6	5
59	Hubbardston	l	r o c	y r	b	Nov. Feb.	Mass.	10	5	9
60	Jefferis	m	ob c	y cr	v g	Sept. Oct.	Penn.	9	6	7
61	Jersey, *Sweet*	m	r ov c	g y r	v g	Sept.	N. J.	8	7	6
62	Jonathan	m s	r c	y r	v g	Nov. Feb.	N. Y.	9	7	9
63	Keswick	m l	ov c	g y r	g	Sept. Oct.	Eng.	2	10	8
64	Lady	v s	f	y r	v g	Dec. May.	Fr.	8	1	5
65	Lady Sweet	l	r ov c	y r	v g	Dec. May.	N. Y.	7	7	7
66	Late Strawberry	m	r c	w r	v g	Oct. Dec.	N. Y.	8	4	5
67	Limber Twig	m	r ob	y r	g	Jan. Apr.	N. C.?	5	7	8
68	Longfield	m	o c	y r	g	Oct. Dec.	Rus.	9	9	9
69	Louise	m	r c	y r	g	Oct. Jan.	Ont.	9	8	8
70	Lowell	l	r ov c	g y	v g	Sept. Oct.	Penn.?	7	7	8
71	Lyscom	l	r	g y r	g	Sept. Nov.	Mass.	7	3	5
72	Maiden Blush	m	r f c	y r cr	g	Sept. Oct.	N. J.	7	8	10
73	Mann	m l	r ob	br y	v g	Jan. Apr.	N. Y.	6	7	9
74	Manomet	m	r ob	r y	v g	Aug. Sept.	Mass.	7	7	4
75	McLellan	m	r ob	y r	v g	Dec. Mar.	Conn.	9	7	8
76	McMahon	l	r c	y r	g	Nov. Dec.	....	9	9	9
77	Melon	m l	r ob c	y cr c	b	Nov. Mar.	N. Y.	10	8	7
78	Mexico	m	r ob	cr r y	b	Sept. Oct.	Conn.	10	6	5

SECTION I.—APPLES.—CONTINUED.

Number.	Locality. East.	 Center.	 South.	 Southern lake shore.	 Northern lake shore.	Remarks.
31	*	*	*	*	*	For the garden. With light culture the fruit is beautiful and excellent.
32	**	**	*	*	*	One of the most attractive dessert apples of its season. Ripens in succession. By some considered profitable.
33	*?	*?	*?	*?	*?	Strong, upright, very productive, tender. Fruit very even sized, often small. Keeps easily a year. Poor quality.
34	*?	*?	*?	*?	*?	Tree lacks vigor. Fruit much called for in the market, but rarely offered. Best on rich, warm soils.
35	*	*	*	*	*	Grows and produces well. Too poor in quality. Size its chief recommendation. Always sells well.
36	*?	*?	*?	*?	*?	Tree vigorous, spreading, productive. Its season and color detract from its value.
37	*	----	*	----	----	The apple grown in this State under this name proves to be the one known as "Newell" in Hillsdale county.
38	*	*	*	*	*	Tree strong, spreading, productive; liable to scab. Often keeps till spring. In central district lacks productiveness.
39	----	----	----	----	----	Grows and bears well. Fruit often scabby. Not extensively grown.
40	*	*	*	*	*	Fruit scabby and imperfect on old trees. Best on new, rich soils. Good at the north. Profitable where it succeeds.
41	*	*	*	*	*	Strong, reddish brown shoots. Very productive. Sometimes scabby. Not esteemed valuable, except perhaps at the north.
42	*?	*?	*?	*?	*?	A seedling of Ben Davis; darker in color and better in quality. Promising for market.
43	*	*	*	*	----	Moderate grower. Upright, roundish. Best desert apple of its season.
44	*?	*?	*?	*?	*?	Vigorous, upright, spreading. Very promising.
45	----	----	----	----	----	Strong, vigorous. The showy fruit is the chief attraction.
46	*?	*?	†	†	*?	Promising for the north on account of its hardiness.
47	**	**	*	*	*	Hardy, vigorous. Shoots slender. Very productive. Brings a high price in late spring, if wintered in close packages.
48	*?	*?	*?	*?	*?	A hardy, spreading, prolific tree. Very popular in its season. Tree tender at the extreme north. Often fed to stock.
49	*?	*?	*?	*?	---	An old sort; superior to many better known.
50	*	*	*	*	**	A promising Russian sort.
51	**	**	*	*	**	A fine culinary fruit. Tree a fine grower and hardy; lacks productiveness. Bears better at the north.
52	*	*	*	*	----	Tree vigorous, productive. Desirable. More than one variety grown under this name.
53	**	**	**	**	*	Tree spreading, vigorous, hardy, prolific. Fruit beautiful. Flavor fine, peculiar.
54	----	----	----	----		Moderate grower, hardy, productive. A good baking sweet apple.
55	*	*	*	*	**	Vigorous, productive. One of the finest of sweet apples.
56	*?	*?	*?	*?	*?	Annual bearer. Fruit beautiful and good, but soon decays. A dessert fruit. A better keeper north.
57	*?	*?	*?	*?	*?	Tree vigorous, spreading. Productive alternate years. A beautiful culinary market fruit.
58	*?	*?	*?	*?	----	Tree upright, vigorous. Very productive. Fruit very beautiful and good.
59	**	**	**	**	**	Should be in every orchard. A very good market variety. Of the highest quality.
60	*	*	*	*	*	A very productive and desirable dessert fruit for early autumn.
61	*	*	*	*	*	Prolific. One of the richest early sweet apples. Tree tender in cen. districts.
62	**	**	**	**	**	Good bearer alternate years. Fruit small, very beautiful and good. Popular.
63	*	**	**	*	*	Cooks well, even when but half grown. Very early bearer. Very hardy and prolific.
64	*?	*?	*?	*?	*?	A beautiful little fancy apple. Brings large price in market in eastern cities. Little known west. Sometimes scabs.
65	*?	*?	*?	*?	*?	A fair baking apple. Desirable as a long keeper. Retains its juice and flavor.
66	*	*	*	*	*	Regular, early bearer. Chenango is often grown under this name.
67	*?	*?	*?	*?	*?	Popular west and south as a long keeper. Distinct from Willow Twig.
68	*	*	*	*	**	A very handsome variety for either dessert or cooking.
69	†	†	†	†	†	Promising for dessert and market.
70	*	*	*	*	*	Strong grower, bears heavily in alternate years. Popular. Profitable.
71	*	----	*	----		Generally fair. Tree vigorous, upright, spreading. Not largely planted.
72	**	**	**	**	**	Spreading, vigorous, prolific. The most popular early autumn market apple. Rather acid for dessert.
73	*	*	*	*	*	Hardy, upright, annual bearer. Not much disseminated. A long keeper.
74	*	*	*	----	----	Vigorous, productive. Fruit excellent. Worthy of increased attention.
75	*	**	*	*	----	Thrifty, upright, productive. An excellent variety for home and market. Bears alternate years.
76	*	**	*	*	**	Tree hardy. Fruit handsome, valuable.
77	*	**	*	*	*	One of the very best dessert apples. Tree hardy, with short, wiry, shoots. Very productive alternate years.
78	*?	*?	*?	----	----	Moderate grower, hardy, productive. One of the finest of dessert apples.

SECTION I.—APPLES.—Continued.

Number.	Names.	Descriptions.						Use and value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
79	Miller (N. Y.)	l	o ob c	y r	v g	Oct. Nov.	N. Y.?	7	6	8
80	Minister	l	o c	g y r	g	Oct. Feb.	Mass.	6	7	5
81	Monmouth *Red Cheek Pippin.*	l	ob c a	y r	v g	Nov. Mar.	N. J.	6	7	9
82	Morris Red *Steele's Red erroneously.*	m l	ov c	r ru	v g	Jan. Apr.	Conn.?	8	8	7
83	Mother	m	r c	y r	b	Nov. Feb.	Mass.	7	6	7
84	Munson *Sweet*	m	ob	y r	v g	Sept. Feb.	Mass.?	6	7	7
85	Northern Spy	l	r c	g y r	b	Dec. Apr.	N. Y.	10	9	10
86	Oakland	m	r ob	y r s	v g	Nov. Mar.	Mich.	8	7	8
87	Oconee	l	r f	y b	g	Nov. Dec.	Ga.	6	6	7
88	Ohio Nonpareil	l	r ob	y r	v g	Nov. Dec.	Ohio	8	9	9
89	Oldenburg	m	r ob	y r	g	Sept.	Rus.	5	9	9
90	Paw Paw, *Rubicon*	m	r o	y r	v g	Dec. June	Mich.	9	5	5
91	Peach Pond *Sweet*	m	ob	y r	v g	Sept. Nov.	N. Y.	6	6	6
92	Peck *Pleasant*	m l	r f	g y r	v g	Nov. Mar.	R. I.?	9	8	9
93	Perry Russet	m	r c l	y r u b	g	Nov. Dec.	N. Y.	6	6	5
94	Pewaukee	m l	r ob	r y	g	Dec. Apr.	Wis.	7	8	8
95	Pomme Gris	s	ob r	ru r	b	Dec. Mar.	Eur.	10	6	5
96	Porter	m l	o c	y r	v g	Sept.	Mass.	8	7	8
97	Primate	m	r ob c	g w cr	v g	Aug. Oct.	N. Y.	10	5	6
98	Pumpkin Sweet, *Pound Sweet*	v l	r	w g y	g	Sept. Dec.	Conn.?	2	8	4
99	Rambo	m	r ob	y w r	v g	Oct. Feb.	N. J.?	8	5	5
100	Ralls, *Genet*	m l	ob c	y r cr	g	Feb. June	Vir.	3	1	5
101	Ramsdell *Sweet, English Sweet*	m l	o c	d r	v g	Oct. Feb.	N. E.	6	9	4
102	Red Astrachan	m l	r c	g y cr	g	Aug.	Rus.	5	9	10
103	Red Canada, *Old Nonsuch*	m	r ob c	y r cr	v g	Dec. June	N. E?	9	8	10
104	Red June	s	ov c	dr	v g	Aug.	N. C.	7	6	2
105	Red Russet	m l	r c	y r ru	v g	Jan. Apr.	N. H.	8	7	5
106	Rhode Island Greening	l	r ob	g y r	v g	Nov. Apr.	R. I.?	9	10	9
107	Ribston	m	r c	y r ru	v g	Nov. Apr.	Eng.	7	7	4
108	Rome *Beauty*	l	r c	y r	g	Nov. Feb.	Ohio	6	7	5
109	Roxbury *Russet*	m l	r ob a	y ru r	v g	Jan. June	Mass.	6	9	7
110	Shiawassee	m	o b	w r	v g	Oct. Jan.	Mich.	10	6	8
111	Smith *Cider*	m l	r ob c	y r	g	Dec. Mar.	Penn.	5	4	7
112	Smokehouse	m l	r ob	y c r	g	Sept. Feb.	Penn.	5	7	8
113	Sops of Wine	m	r	y r	g	Aug. Sept.	Eur.	4	6	6
114	Stark	l	r c	g y r	g	Jan. May	Ohio?	6	7	8
115	St. Lawrence	l	o b c	y c	v g	Sept. Oct.	Can.?	8	8	9
116	Summer Paradise	......	r f	g y	v g	Aug. Sept.	Penn.	9	7	4
117	Summer Pearmain *American Summer.*	m	o	y r	b	Sept.	Am.	10	5	5
118	Summer Queen	l	r c	y r	g	Aug. Sept.	N. Y?	6	7	6
119	Summer Rose	s	r	y r	b	Aug.	N. J.	10	7	5
120	Sutton	l	r ov	y r	v g	Dec. Feb.	Mass.	9	8	9
121	Swaar	l	r ob	y ob	b	Dec. Apr.	N. Y.	10	6	4
122	Tetofski	m	r ob c	y r	g	Aug.	Rus.	5	7	----
123	Tewksbury	s	ob	y r	v g	Jan. July	N. J.	7	7	5
124	Thaler	l	r ov	l y	g	Sept.	Rus.	7	---	----

SECTION I.—APPLES.—CONTINUED.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore.	Northern lake shore.	
79	*?	*?	*?		----	Vigorous, productive. A promising fruit for market and general purposes.
80	*?	*?	*?	*?	----	Moderately vigorous, very productive. Not widely disseminated.
81	*?	*?	*?	*?	----	Vigorous, upright, productive. Is a good market variety.
82	*	*	*	*	----	Vigorous, stocky; leaves large. Buds prominent. May be an old variety. Also known in Fulton county, Ohio.
83	*	**	*	*	-	Productive. An excellent dessert apple. Deserves more attention.
84	*	*	*	--	*	Tree spreading, vigorous, prolific. Fruit very perfect, even sized, and beautiful.
85	**	**	**	**	**	Strong, upright, hardy. Tardy bearer. Fruit sometimes uneven and imperfect. Requires good culture and careful handling.
86	*	*	*	*	*	Popular in Oakland county. Less disseminated elsewhere.
87	*?	----	--	----	----	A vigorous, hardy, southern apple. Does well in eastern Michigan.
88	*	**	*	*	**	Very vigorous, productive. One of the most valuable late autumn apples.
89	**	**	**	**	**	Hardy, vigorous, very productive. Of little value except for cooking and market. Sells well, but soon decays.
90	*?	*?	*?	*?	*?	Hardy, moderate grower, regular bearer. Must have suitable soil and good culture.
91	---		-	---	----	Tree vigorous, spreading, productive. A beautiful, desirable sweet apple.
92	*	*	*	*	*	Habit of tree like R. I. Greening, but less vigorous. Generally and deservedly popular. Fruit beautiful and excellent.
93	*?	*?	*?	*?	*?	Distinct from Golden Russet. An early, abundant bearer. More than one variety is probably grown under this name.
94	*	*	*?	*?	*	Hardy and productive.
95	*?	*?	*?	*?	*?	Moderate, upright grower. Good early bearer. An excellent fine dessert apple. Less successful on light soils.
96	*	**	*	*	*	Usually very fair. Valuable for market as well as dessert.
97	*	**	**	**	*	One of the best dessert apples. Subject to water core and other defects. Ripens in succession.
98	*?	*?	*?	*?	*?	Tree strong, upright, spreading. Fruit often water cored. Culinary.
99	*	*	*?	*	*?	A vigorous but tender tree. Overbears and produces small fruit. A very common farmers' apple.
100	.	----	----	---	----	Hardy, vigorous, spreading. Better farther south. Blossoms late.
101	*	*	*	*	*	Very vigorous and productive. Best sweet apple of its season for cooking and market.
102	**	**	**	**	**	Strong grower; early bearer; hardy. Fruit beautiful; showy; profitable; too sour for dessert.
103	**	**	*	**	**	Very popular for market where fully proved. Tree not vigorous. Should be top-grafted in all cases. Best on strong soils.
104	*	*	*	*	---	Often small, scabby and imperfect. Quality excellent. Ripens in succession. Better farther south.
105	?	*?	*?	*?	*?	Tree much like Baldwin. The same is true of fruit except the russet, and higher flavor.
106	*	**	*	**	**	Tree spreading, vigorous; generally productive on strong soils; best at lake shore. One of the old favorites
107	*?	*?	*?	*?	*?	Tree a good grower, productive. High, sharp flavor. Succeeds at the north.
108	*?	*?	*?	*?	*?	Moderate grower, productive. Inclined to overbear on old trees.
109	*	*	*	*	*	Very liable to attacks of the codling moth. Tree strong, spreading, productive, tender. Not profitable on light soils.
110	**	**	**	**	**	Tree hardy, vigorous, upright, spreading, productive. Like Fameuse, but superior to it.
111	*?	*?	*?	*?		Very productive, vigorous, straggling. Valued for market purposes.
112	*?	?	*?	*?	*?	Vigorous, spreading, productive. Culinary, market.
113	*?	*?	*?	*?	*?	Tree vigorous, upright, productive. Widely disseminated, but not valuable.
114	*	**	**	**	*	Tree vigorous, hardy, productive. Fruit good enough to sell. Valued as a market fruit.
115	*	*	*	*	*	Tree very vigorous, productive. Highly and justly valued. Sometimes cracks and scabs
116	*?	*?	*?	*?	*?	Tree spreading, drooping, moderate regular bearer. Very desirable among sweet apples.
117	*	*	*	*	*	Slow grower, hardy. Fruit, when perfect, mild, rich, excellent. Very beautiful.
118	*?	*?	*?	*?	*?	Liable to scab. One of the best cooking apples. Popular.
119	*?	*?	*?	*?	*?	Tree moderately vigorous, productive. One of the finest dessert fruits of its season.
120	*	*	*	*	†	Promising for home use and market.
121	----	----	----	---	---	Can only be recommended as an amateur fruit. Tree lacks hardiness. Fruit often imperfect. Requires rich, warm, dry soil.
122	----	*?	---	---	*?	Of little value, except where great hardiness is required.
123	..	..	----	.	----	Tree vigorous, upright, productive. A fine, long keeping table fruit.
124	†	†	†	†	†	One of the best early Russian sorts.

SECTION I.—APPLES.—CONCLUDED.

Number.	Names.	Descriptions.						Use and value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
125	Titvoka (*Titus*)	l	r ob							
126	Tolman Sweet	m	r	w y r	v g	Nov. Apr.	R. I.	6	8	6
127	Tompkins King	l	r f c a	y r cr	v g	Dec. Mar.	N. J.?	8	6	8
128	Townsend	m	ob c	y r	g	Aug. Sept.	Penn.	6	6	7
129	Trenton *Early*	m l	r ov	y r	g	Aug.	Am ?	6	6	8
130	Twenty Ounce *Cayuga Red Streak.*	v l	r	g y r	g	Oct. Jan.	Conn.	5	7	9
131	Vandevere	m	ob	y r	g	Nov. Mar.	Del.	6	8	9
132	Wagener	m	r ob	y cr	v g	Nov. Mar.	N. Y.	9	8	8
133	Warfield	l	ob c	y r	v g	Sept. Oct.	Iowa	10	8	10
134	Washington *Strawberry*	l	r c f	y r	v g	Sept. Oct.	N. Y.	7	7	8
135	Wealthy	m	r ob	y cr	v g	Autumn.	Minn.	8	6	8
136	Westfield	m l	r c	g r ru	b	Oct. Mar.	Conn.	9	5	7
137	Western Beauty	m	o b c	y r	g	Oct. Dec.		8	8	8
138	White Pippin	l	r ob l	g w y	v g	Jan. Apr.	Am.?	6	7	5
139	Williams	m	r oc	r	g	Aug. Sept.	Mass.	6	5	7
140	Willow *Twig, James River*	m	r c	y r	g	Dec. May	Vir.	5	7	7
141	Wine, *Hays Winter*	m l	r f	d r y	g	Oct. Mar.	Del.	7	7	6
142	Winesap	m	r ob c	d r y	v g	Nov. May	N. J.	6	6	4
143	Yellow Bellflower	v l	o c	g y r	v g	Dec. Mar.	N. J.	8	10	7
144	Yellow Newtown	m	r ob l	y r	b	Dec. May	N. Y.	10	8	3
145	Yellow Transparent	m	r o b	y	g	Aug.	Rus.	8	8	7

SECTION I—APPLES.—CONCLUDED.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore.	Northern lake shore.	
125	†	†	†	†	†	A promising Russian variety.
126	**	**	**	**	**	Best winter baking apple. The most popular and profitable sweet market apple.
127	**	**	*	*	**	Apt to blow down. A good early winter dessert fruit. Improves at the north.
128	*?	*?	*?	*?	*?	Tree vigorous, upright, spreading, productive. Little known; almost "very good."
129	*?	*?	*?	*?	*?	Tree moderately vigorous, productive, hardy. A fine, profitable, orchard fruit.
130	**	**	*	**	**	Fruit sometimes imperfect in Lenawee county. Very profitable for market.
131	*?	*?	*?	*?	*?	Distinct from N. Y. Vandevere. Valuable.
132	**	**	**	*	**	Very early bearer; ruining the tree unless thinned and highly cultivated. Fine dessert apple. Sells well in market.
133	**	**	*	*	*	A large and handsome dessert variety. Trees very productive.
134	*	**	**	*	*	Tree vigorous. Bears early and abundantly. A valuable variety for general purposes.
135	**	**	**	**	**	Originated with Peter M. Gideon. Valuable at the north. Very hardy.
136	*	**	*	*	*	Popular old variety for home use. Somewhat lacking in productiveness, and hence unprofitable.
137	*	*	*	*	*	A desirable variety for home use or market.
138	*?	*?	*?	*?	*?	Tree vigorous, upright, productive. Fruit of the Newtown Pippin class. Popular south.
139	*?	*?	*?	*?	*?	Tree a good grower; productive. Valued by some as a market variety.
140	*?	*?	*?	*?	*?	Hardy, vigorous, productive. Fruits vary greatly in size. Keep and sell well.
141	----	----	----	----	----	Hardy, prolific. A fine, though little known, winter fruit.
142	*?	*?	*?	*?	*?	Irregular grower; good, early bearer. Good for dessert, market or cider—Downing. Valuable in Lenawee county.
143	*?	*?	*?	*?	*?	Needs dry, warm soils. High, rich flavor. Uneven in size. Often unproductive. Not successful at the north. Fruit much in demand.
144	*?	*?	*?	*?	*?	Tree and fruit like the Green Newtown. Some doubt their distinctness.
145	*	**	*	*	**	One of the best of the early summer sorts for cooking purposes.

SECTION II.—APPLES—CRABS.

ABBREVIATIONS FOR THIS SECTION.

Form.

a. angular.	o. oblong.
c. conical.	ob. oblate or obtuse.
f. flattened.	ov. oval or ovate.
l. lopsided or oblique.	r. roundish.

Number.	Names.	Description.						Use and value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Hyslop	1	r ov	d r o	g	Sept. Nov.	Am.	4	8	10
2	Large Red	1	r ov	y r	g	Sept. Oct.	Am.	4	6	6
3	Large Yellow	1	r ov	y o	g	Sept. Oct.	Am.	5	8	8
4	Martha	1	o	y r	g	Aug. Sept.	Minn.	6	9	9
5	Montreal	1	r ob	y r	g	Sept. Oct.	Am.	4	7	8
6	Transcendent	1	r ob	y cr	g	Sept.	Am.	5	8	10
7	Whitney	1	r ov	y r	b	Sept.	Ill.	7	8	9

In selecting varieties of apples for home use it is always well to include such varieties as will provide for a succession throughout the season,—using a greater number of the winter kinds. While productiveness, size and color are desirable, quality should be considered, especially in the kinds intended for dessert purposes and home use, even more than in the case of those designed for the market. As will be seen from the preceding fruit list, the following are among the best in their respective season in nearly all parts of the State: Summer—Early Strawberry, Yellow Transparent, Golden Sweet, Red Astrachan and Sweet Bough; fall—Oldenburgh, Gravenstein, Chenango, Keswick, Washington Strawberry, Maiden Blush, Bailey *Sweet* and Shiawassee; winter—Jonathan, King, Grimes *Golden*, Hubbardston, Wagener, Rhode Island Greening, Baldwin, Sutton *Beauty*, Red Canada, Tolman *Sweet*, Northern Spy and Stark. While any of these will be desirable for market in sections

SECTION II.—APPLES—CRABS.

ABBREVIATIONS FOR THIS SECTION.

Color.

b. brown.
c. carmine.
cr. crimson.
d. dark.
g. green.
o. orange.
p. purplish.
r. red.
ru. russet.
s. scarlet.
v. vermillion.
y. yellow.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore.	Northern lake shore.	
1	**	**	**	**	**	An exceedingly rich looking crab. Keeps well. Sells well.
2	*	*	*	*	*	A vigorous tree, productive. Has the calyx large and prominent.
3	*	*	*	*	*	One of the most beautiful and prolific. Bears in alternate years.
4	†	†	†	†	†	One of the hardiest and best of the crabs.
5	**	**	**	*	**	Unexcelled in beauty and appearance. Said to be less beautiful at the north.
6	**	**	**	**	**	One of the largest, most productive and beautiful of the older crabs.
7	*	**	*	**	*	Very large, beautiful and excellent. Tree vigorous, upright productive.

where a paying demand can be found for summer or fall varieties, those in the winter list will be most desirable for extensive orchard planting and the best results will be obtained if not more than a half dozen kinds are selected, and oftentimes the list should be restricted to two or three sorts that are particularly adapted to one's location. Baldwin has been one of the best kinds, but is rather tender in low spots and is much troubled by the scab fungus on both fruit and foliage. The Northern Spy has, as its one objectionable feature, its lateness in coming into bearing. Red Canada, when top worked, is generally a profitable sort, and Wagener and Jonathan, when given good care and not allowed to overbear, will generally give good results. Among the best of the new kinds, Hubbardston and Sutton *Beauty* are hardy, productive varieties, with fruit of good size, color and quality.

SECTION III.—APRICOTS.

ABBREVIATIONS FOR THIS SECTION.

Form

c. conical.
co. compressed.
d. depressed.
o. oblong.
ov. oval
r. roundish.

Color.

o. orange.
r. red.
y. yellow.

Number.	Names.	Description.						Use and value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Breda	m	r	o	v g	b. Aug.	Eur.	7	----	----
2	Early Golden	s	r ov	o	v g	m. July	Am.	6	----	----
3	Harris	l	r ov	o	g	b. Aug.	Am.	8	----	9
4	Large Early	m	o co	o	b	m. July.	Eur.	8	----	----
5	Moorpark	l	r	o y	b	b. Aug.	Eur.	9	----	----
6	Peach	v l	r d co	y o	b	b. Aug.	Eur.	10	----	----

SECTION IV.—BLACKBERRIES.

ABBREVIATIONS FOR THIS SECTION.

Form.

c. conical.
o. oblong.
ov. oval.
r. roundish.

Number.	Names.	Descriptions.						Use and value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Agawam	l	r o	b	v g	m	Am.	9	9	7
2	Ancient Briton	l	o ov	b	v g	l	Ark.	8	7	7
3	Early Harvest	s	r o	b	v g	v e	Ill.	8	8	8
4	Eldorado	l	r o	b	v g	e	Ohio.	8	9	9
5	Erie	l	r o	b	v g	m	Pa	8	8	7
6	Kittatinny	l	r c	b	b	m	N. J.	10	10	7
7	Lucretia (Dewberry)	l	o ob	b	v g	v e	Va.	8	----	7
8	Minnewaska	l	o ov	b	v g	m	N. Y.	9	9	7
9	Snyder	m	r ov	b	v g	e	Ind.	7	9	10
10	Stone	m s	r	b	v g	e	Wis.	7	7	7
11	Taylor	l	r o	b	v g	e	Am.	10	10	9
12	Wallace	l	o ov	b	v g	m	Am.	9	9	7
13	Western Triumph	m	ov	b	v g	m l	Am.	9	9	8
14	Wilson (*Junior*)	l	o ov	b	g	e	N. J.	9	9	8

Many of the varieties of best quality are lacking in hardiness and cannot be grown without covering, but with a little care any of the sorts mentioned will succeed. Snyder and Taylor are among the best of the old kinds; Eldorado, in hardiness, productiveness and fruit, greatly resembles the Snyder, although it is somewhat larger. The Erie succeeds well in many localities and, by covering, the Wilson and Early

SECTION III.—APRICOTS.

Apricots are recommended for dessert or amateur purposes, with little reference to actual profit as owing to occasional loss of the very early bloom, and liability to injure from extreme cold in unfavorable localities, together with extreme liability to the depredations of the curculio, little pecuniary return can be confidently anticipated from them. Since they are recommended only as amateur fruits, they are not quoted for cooking or market.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore	Northern lake shore.	
1	*	*	*	*	*	Hardy, productive, excellent. Kernel sweet.
2	†	†	†	†	†	Tree vigorous. Branches long, slender. Freestone.
3	†	†	†	†	†	A promising hardy variety.
4	†	†	†	†	†	Vigorous. One of the best early varieties. Freestone. Kernel bitter.
5	*	*	*	*	†	One of the most popular. Stone perforated. Kernel bitter.
6	*	*	*	*	*	Considered the finest variety. Stone perforated. Kernel bitter.

SECTION IV.—BLACKBERRIES.

ABBREVIATIONS FOR THIS SECTION.

Color.
b. black.
w. white.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore.	Northern lake shore.	
1	*	*?	*?	*	----	Not fully hardy, but productive and fine.
2	*	*	*	*	----	Strong grower and prolific. Well worthy of extended trial.
3	*	*	*	*	*	Brunton has been disseminated under this name. The genuine is claimed to be hardy, but does best with protection.
4	*	**	*	*	*	Plants hardy and fruit of good size.
5	*?	*?	*?	*?	----	A strong spreading grower. Productive in some localities.
6	*?	*?	*?	*?	*?	Too well known to need description. Sometimes rusts or mildews.
7	--	----	*	--	----	The largest, most productive, and best.
8	*?	*?	*?	*?	*?	Vigorous, hardy, productive.
9	**	**	**	**	**	Not large, but good. Very hardy and prolific.
10	*?	*?	*?	*?	*?	Bears heavily. Size rather small. Hardy. In Lenawee county equals Snyder for market.
11	*	*	*	*	*	Nearly as hardy as Snyder.
12	*?	*?	*?	*?	----	Nearly hardy; vigorous; productive.
13	*	*	*	*	*	Hardy, vigorous and prolific Valuable in Lenawee county.
14	*	*	*	**	*	One of the largest. Lacks richness. Needs winter protection.

Harvest are generally found to be profitable for market. Owing to the fact that blackberries ripen in mid-summer, when droughts generally prevail, the best results cannot be obtained unless they are upon soil that is quite retentive of moisture. There are few sections in the State, in which water can be readily obtained, where irrigation cannot be used to advantage on this crop.

SECTION V.—CHERRIES.—Heart and Bigarreau.

ABBREVIATIONS FOR THIS SECTION.

Form.

a. angular. c. conical. l. long. ob. obtuse.
co. compressed. o. ovate or oval. h. heart shaped. r. roundish.

The numbers under the head of "cooking" recommend strictly for canning or drying with sugar as raisins.

Number.	Names.	Descriptions.							Use and value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Class.	Origin.	Dessert.	Cooking.	Market.
1	American Heart	l	h	a b r	g	m June	h	Am.	6	7	7
2	Bigarreau, *Yellow Spanish*	v l	ob h co	y c r	b	e June	b	Eur.	10	9	7
3	Black Eagle	m	ob h	b	b	b July	h	Eng.	9	8	9
4	Black Hawk	l	ob h co	p b	v g	e June	h b	Ohio.	9	6	9
5	Black Heart	l	h	b	v g	e June	h	Eur.	9	6	9
6	Cleveland	l	r h	r y	v g	m June	b	Ohio.	9	6	8
7	Downer	m	r h ov	a r	v g	b July	h	Mass.	9	6	10
8	Early Purple	m	r h	d r p	v g	b June	h	Eur.	9	6	6
9	Elton	l	l h	y br r	v g	m June	b	Eng.	9	7	9
10	Governor Wood	l	v h	y r	v g	m June	h	Ohio.	9	6	8
11	Kirtland Mary	l	r h	y r	v g	b July	b	Ohio.	8	....	7
12	Knight Early	l	ob h	d p b	v g	m June	h	Eng.	8	6	6
13	Mezel, *Bigarreau De Mezel* *Great Bigarreau.*	v l	ob h	d r b	g	b July	b	Eur.	6	6	8
14	Napoleon	v l	l h	y r	g	b July	b	Eur.	6	6	8
15	Rockport	l	r ob h	r a	b	m June	b	Ohio.	9	7	9
16	Tartarian	v l	ob h	p b	v g	m June	h b	Rus.	9	8	9
17	Vilne Sweet	l	r h	r y	g	e June	h	Rus.	....	....	....
18	Windsor	l	....	....	......	b July	b	Ont.	....	....	....

SECTION V.—CHERRIES.—Heart and Bigarreau.

ABBREVIATIONS FOR THIS SECTION.

Color.						Class.	
a.	amber.	cr.	crimson.	w.	whitish.	b.	bigarreau.
b.	black.	d.	dark.	y.	yellowish.	h.	heart.
br.	bright.	p.	purplish.				
c.	carmine.	r.	red.				

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore.	Northern lake shore	
1	*	*	*	*	....	Vigorous, spreading, productive; but variable in quality.
2	**	**	**	**	**	Downing says: "Largest, most beautiful, and delicious of cherries." Often cracks and rots in wet seasons.
3	*	*	*	*	*	Excellent. Requires age before it will bear profusely.
4	*	*	*	*	....	Fine tree. Fruit much like Bigarreau in its general qualities.
5	*	*	*	*	*	Very old. Tree large and hardy. The abundant fruit is of fine quality.
6	*	*	*	*	*	A seedling of the late Dr. Kirtland of Cleveland, Ohio. Tree thrifty, spreading, productive.
7	**	**	*	**	....	One of the finest and most valuable late cherries. Of New England origin.
8	*	*	*	**	*	A moderate grower. One of the best of the very early cherries, Hardy for a Mazzard; but tender at the north.—[Parmelee.]
9	*	**	**	*	**	Originated in England in 1806. One of the best of its class and season.
10	**	**	**	**	**	Seedling of the late Dr. Kirtland. Every way desirable except for its liability to rot.
11	*	*	*	*	....	Seedling of the late Dr. Kirtland. Desirable for either dessert or market.
12	*?	*?	*?	*?	*?	A week earlier than Black Tartarian. Fine quality. Tree spreading.
13	*?	*?	*?	*?	*?	Supposed to be identical with Great Bigarreau and large Red Prool.
14	**	*	*	**	**	Very large and showy. Very firm. Most valued for the market.
15	**	*	*	**	*	Seedling of the late Dr. Kirtland. Very highly esteemed. A good bearer.
16	**	**	**	**	**	A rapid, erect grower. Prolific. Fruit very large and showy, but not of the highest quality. Tree lacks hardiness.
17	†	†	†	†	†	A very promising sweet cherry.
18	†	†	†	†	†	Promising, but less hardy than is claimed.

SECTION VI.—CHERRIES—DUKE AND MORELLO.

ABBREVIATIONS FOR THIS SECTION.

Form.	Color.
co. compressed.	a. amber.
h. heart shaped.	b. bright.
ob. oblate.	d. dark.
ov. oval.	p. purplish
r. roundish.	r. red.
	y. yellow.

Number.	Names.	Descriptions.							Use and value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Class.	Origin.	Dessert.	Cooking.	Market
1	Brusseler Braune	l	r h	p r	v g	m July.	m	Rus.	7	6	10
2	Carnation	l	r	y w r	g	m July.	------	Fr.?	6	6	----
3	Choisy, *Belle de*	m	r ob	y a r	b	m June.	d	Fr.	10	6	----
4	Dyehouse	m	r o	r	g	v e	m	Ky.	5	8	8
5	Eugenie	l	r ob	d r	v g	m June.	d	Eur.	7	6	
6	Late Duke	l	ob h	d r	v g	m July.	d	Eur.	7	7	6
7	Late Kentish, *Common Red*	m	r ob	d r	g	m July.	m	Eur.	4	8	8
8	Leib	m	r	r	g	July.	m	Eur.	----	----	----
9	Louis Phillippe	l	r	d p r	v g	e July.	m	Fr.	4	10	10
10	Magnifique	l	ob	r	v g	e July.	d	Fr.	6	8	
11	May Duke	l	r ob h	d r	b	m June.	d	Eur.	8	8	10
12	Montmorency Ordinaire	l	r ob	d r	v g	e June.	m	Eur.	5	8	10
13	Montreuil	l	----------	r	g	----------	d	Eur.	----	----	----
14	Morello	l	ob h	d r	v g	m July.	m	Eur.	5	10	10
15	Ostheim	m	r ov	d r	g	e July.	m	Rus.	5	8	8
16	Reine Hortense	v l	r ov	d r	v g	m July.	d	Fr.	6	7	8
17	Richmond, *Kentish*	m	r ob	d r	v g	m June.	m	Eur.	5	9	10
18	Royal Duke	l	r ob	d r	g	e June.	d	Eur.	6	7	9
19	Shadow Morello	l	r h	p r	v g	m July.	m	Rus.	7	9	9
20	Wragg	m	r ob	r	g	m July.	m	Iowa.	5	7	10

In some sections the sweet varieties are very productive, and the size, flavor and appearance of the fruit make them valuable either for home use or market, but in many sections the trees fail to ripen properly, and as a result the trunks crack and the trees soon die. Among the most desirable sorts are Governor Wood, Napoleon, Bigarreau (Yellow Spanish), Elton and Downer. For most sections the sour kinds are best adapted, as the trees are hardy and productive, and the fruit is well adapted for cooking purposes, or for eating if one does not find them

SECTION VI.—CHERRIES—Duke and Morello.

ABBREVIATIONS FOR THIS SECTION.

Class.

d. duke.
m. morello.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore.	Northern lake shore.	
1	†	**	†	†	†	Very hardy. Large fruit of fine quality. Productive.
2	*?	*?	*?	*?	*?	A beautiful, large, light-red cherry, highly esteemed where known.
3	*	*	*	*	*	One of the best dessert cherries of any class, but a thin bearer. When on sandy soil, or top-grafted on Morello, proves productive.
4	*	*	*	*	*	An early cherry resembling Richmond.
5	*?	*?	*?	*?	*?	A new French cherry. An early and prolific bearer.
6	*	*	*	*	*	Valuable for dessert or cooking. Ripening after May Duke.
7	*	**	**	*	*	Emphatically the pie cherry of this country.
8	----	----	----	----	----	A newly introduced variety. Claimed to withstand the winters of the northwest.
9	*	*	*	*	*	A strong, healthy tree of the Morello class. Productive, valuable.
10	*	*	*	*	*	Moderate grower, productive. Good for dessert when fully ripe.
11	**	**	**	**	**	The type of its class. One of the oldest and most popular cherries.
12	**	**	**	**	**	Larger than Early Richmond and ten days later.
13	*	*	*	*	*	Well worth planting.
14	**	**	**	**	**	Highly esteemed for preserving and other culinary purposes.
15	†	†	†	†	†	Promising. Hardy and productive.
16	*	*	*	*	*	A healthy and beautiful tree. A popular and desirable variety.
17	**	**	**	**	**	One of the most profitable market cherries. Not as good as several of the Dukes.
18	*	*	*	*	*	An upright, compact grower. Later than May Duke.
19	†	†	†	†	†	Fruit like Brusseler, but the tree is smaller.
20	†	**	†	†	†	Very hardy. Bears young. Productive.

too acid; they succeed best on high, well-drained sandy loam, and except when injured by the frost, seldom fail to give a crop. Among the best kinds are Early Richmond, Montmorency and English Morello; of the newer kinds Wragg and Brusseler Braune are very promising, as they appear to be an improvement over the English Morello, being larger, later and of stronger growth; among the Duke class of sour cherries, May Duke, Royal Duke and Late Duke can generally be grown with success.

SECTION VII.—CURRANTS.

ABBREVIATIONS FOR THIS SECTION.

Form of bunch.

l. long.
m. medium.
s. short.

Color.

b. black.
br. bright.
d. dark.
r. red.
w. white.

Number.	Names.	Descriptions.						Use and value. Scale 1 to 10.		
		Size.	Form of bunch.	Color.	Flavor.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Cherry	l	s	r	v a	m July.	Eur.	7	8	6
2	Fay	l	l	r	a	July.	N. Y.	7	8	6
3	Lee	l	s	b	a m	m July.	Eur.	1	8	9
4	London Red	m	m	r	a	m July.	Eur.	7	8	8
5	Naples	l	s	b	a m	m July.	Eur.	1	8	9
6	North Star	m	s	r	a	m July.	Minn.	8	8	9
7	Prince Albert	m	m	d r	a	e July.	Eur.	8	9	8
8	Red Cross	l	l	r	a	m July.	N. Y.	7	8	8
9	Red Dutch	m	m	d r	a	b m July.	Eur.	9	10	9
10	Versaillaise	l	s	d r	a	m July.	Fr.	7	8	6
11	Victoria	m	l	b r r	v a	e July.	Eng.	8	8	9
12	White Dutch	m	m	w	a	b m July.	Eur.	10	7	6
13	White grape	m	m	w	a	b m July.	Eur.	9	8	8

The large red varieties are, as a rule, not successfully grown as they are subject to the attack of the stem borers. Victoria, Red Dutch, Prince Albert and London Red are particularly valuable among the red sorts;

SECTION VII.—CURRANTS.

ABBREVIATIONS FOR THIS SECTION.

Flavor.

a. acid.
m. musky.
v. very.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore.	Northern lake shore.	
1	*	*	*	*	*	Its size renders it popular. One of the most acid of currants.
2	*?	*?	*?	*?	*?	Long bunch. Large berry. Seldom productive. Injured by borers.
3	*	*	*	*	*	Possibly a slight improvement upon Black Naples.
4	†	†	†	†	†	A promising market sort.
5	*	*	*	*	*	Good culinary fruit. Much sought in the market by foreigners.
6	*	*	*	*	*	One of the most valuable of the new sorts.
7	*	**	*	*	**	Little injured by the worms. Good as a late sort.
8	†	†	†	†	†	A highly praised new variety.
9	**	**	**	**	**	Has no superior except in size. The best for all purposes.
10	*	*	*	*	*	By some believed to be superior to the Cherry currant. Others think them identical.
11	**	**	**	**	**	Valuable, rather late sort. Nearly exempt from the attacks of the borer.
12	**	**	**	**	**	Better in quality, and in the habit of the plant than White Grape.
13	*	**	*	*	**	Plant of spreading, straggling growth. Larger, but not as good as White Dutch.

White Dutch and White Grape as white varieties and Naples and Lee among the black.

SECTION VIII.—GOOSEBERRIES.

ABBREVIATIONS FOR THIS SECTION.

Form of berry.

ov, oval.
r, round.

Number.	Names.	Descriptions.						Use and value. Scale 1 to 10.		
		Size.	Form of berry.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Champion	m to l	r ov	w g	v g	Aug.	Am.	8	9	8
2	Chautauqua	l	r ov	g y	v g	Aug.	Eur.	9	9	8
3	Columbus	l	r ov	y	v g	Aug.	Eur.	8	8	8
4	Downing	m l	r ov	w g	v g	Aug.	N. Y.	8	10	10
5	Golden Prolific	l	r ov	y	v g	Aug.	Eur.	8	8	8
6	Houghton	s	r	b	v g	Aug.	Mass.	6	9	8
7	Industry	l	r ov	r	v g	Aug.	Eur.	9	9	7
8	Keepsake	vl	r ov	y g	v g	Aug.	Eur.	9	9	8
9	Lancashire *Lad*	l	r ov	r	v g	Aug.	Eur.	9	9	8
10	Pale Red	s	r ov	r	g	Aug.	Am.	6	8	8
11	Pearl	m	r ov	y g	g	Aug.	Can.	9	10	9
12	Red Jacket	l	r ov	r	v g	Aug.	Am.	8	8	8
13	Smith	l	ov	g	v g	Aug.	Ver.	10	10	9
14	Triumph	l	r ov	y	v g	Aug.	Eur.	8	8	8

Until recently the gooseberry has been found a profitable market crop, but it has been so extensively planted that the market has usually been overstocked and of late years the prices have been low. Much trouble has resulted because growers have persisted in stripping the branches of the fruit before it is ripe and this has resulted in greatly reducing the demand. The English varieties have not been grown successfully here on account of the attack of the powdery mildew, but as they are larger and of a much better quality than the American sorts, a good demand and remunerative prices can be obtained for them if they can

SECTION VIII.—GOOSEBERRIES.

ABBREVIATIONS FOR THIS SECTION.

Color.

b. brown.	r. red.
g. green.	w. whitish.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore.	Northern lake shore.	
1	†	†	†	†	†	Very productive. Worthy of trial.
2	†	†	†	†	†	A promising new sort.
3	†	†	†	†	†	A productive and promising sort. Needs spraying.
4	**	**	**	**	**	Fine, stocky, vigorous plant; quite thorny. The highest quality of fruit.
5	†	†	†	†	†	Highly praised. Subject to mildew.
6	*	*	*	*	*	Slender and straggling, but vigorous, prolific and excellent.
7	*?	*?	*?	*?	*?	Subject to mildew. Unproductive unless sprayed.
8	†	†	†	†	†	A promising European variety.
9	†	†	†	†	†	A little later than Industry and less subject to mildew. Promising.
10	*	*	*	*	*	An old sort of slender but upright growth.
11	*	*	*	*	*	Although small, its productiveness makes it valuable.
12	†	†	†	†	†	With spraying the plants are healthy and productive.
13	*	*	*	*	*	Some doubt as to the vigor of the plant. An excellent variety.
14	*?	*?	*?	*?	*?	A large attractive sort. Valuable only with spraying.

be produced at a reasonable price. By the proper pruning of the plants, so as to open up the heads, and frequent sprayings with liver of sulphur, the mildew can be held in check and good crops can be secured. The European varieties in particular need a moist, rich soil and should be planted where they will have a good circulation of air. The Downing has been most used of the American varieties. Champion and Pearl are promising kinds, while Keepsake, Columbus, Lancashire *Lad* and Chautauqua are among the best of the European sorts.

SECTION IX.—GRAPES.—NATIVE.

ABBREVIATIONS FOR THIS SECTION.

Bunch.		Form.	Berry.
b. broad.	o. open or loose.	sh. shouldered.	r. round.
c. compact.	s. short.	v. very.	o. oblong.
l. long.			ov. ovate or oval.

Number.	Names.	Descriptions.								Use and value. Scale 1 to 10.		
		Size.		Form.		Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
		Bunch.	Berry.	Bunch.	Berry.							
1	Adirondac	l	l	c sh	r	p b	v g	b Sept.	N. Y.	8	----	4
2	Agawam, *Rog. 15*	l	l	c sh	r	d r	v g	m Sept.	h Mass.	7	----	7
3	Aminia, *Rog. 39*	......	l	c sh	r	b	v g	m Sept.	h Mass.	8	----	7
4	Barry	l	l	s b c	r	b	g	m Sept.	h Mass.	7	----	7
5	Berlin	l	l	-----	r	g w	v g	m Sept.	Mich.	8	----	9
6	Brighton	m	l	c sh	r	r	v g	m Sept.	W.N.Y.	10	----	9
7	Campbell	l	l	c sh	r	b	v g	b Sept.	Ohio	9	----	10
8	Catawba	m	l	sh o	r	r	v g	Oct.	Md.	9	----	6
9	Champion, *Talman*	m	l	s c sh	r	b	g	b Sept.	Am.	4	----	4
10	Clinton	m	s	c sh	r	b	g	Oct.	N. Y.	3	----	3
11	Concord	l	m l	c sh	r	b	v g	m Sept.	Mass.	8	----	10
12	Cottage	l	l	l	r	b	g	b Sept.	Mass.	6	----	5
13	Delaware	s	s	c sh	r	l r	b	m Sept.	N. J.?	10	----	9
14	Diamond	l	l	l sh	r	w	v g	m Sept.	N. Y.	9	----	6
15	Diana	l	l	c l	r	r l	v g	e Sept.	Mass.	6	----	6
16	Eaton	v l	v l	l sh	r	b	g	m Sept.	Mass.	4	----	8
17	Empire State	l	m	sh	r ov	w	v g	m Sept.	N. Y.	8	----	6
18	Goethe	m	l	o v	r	y g	v g	e Sept.	Mass.	8	----	3
19	Hartford	l	l	c sh	r	b	g	b Sept.	Conn.	4	----	6
20	Hayes	m	m	s b	r	y w	v g	Sept.	Mass.	8	----	6
21	Herbert, *Rog. 44*	l	l	l	r	b	v g	m Sept.	h Mass.	8	----	7
22	Hosford	l	l	c sh	r	b	v g	b Sept.	Mich.	7	----	9
23	Iona	l	l	o ch	r o	r	b	m Sept.	N. Y.	10	----	6
24	Isabella	l	l	c sh	o	b	v g	e Sept.	S. Car.	6	----	3
25	Ives	m	m	c sh	r o	b	g	m Sept.	Ohio.	4	----	8
26	Janesville	s	m	s c	r	b	g	m Sept.	Am.	4	----	8
27	Jessica	m s	m s	......	r	y g	b	b Sept.	Ont.	9	----	7
28	Jewel	s	s	s	r	b	v g	b Sept.	Kans.	8	----	7
29	Lady	m	l	l c	r	y g	b	m Sept.	Ohio.	10	----	7
30	Lady Washington	v l	m	sh c	r	y	g	e Sept.	N. Y.	7	----	3
31	Lindley, *Rog. 9*	m	m	l c	r	r	v g	m Sept.	h Mass.	7	----	8
32	Lyon	l	l	c	r	w	b	e Sept.	Mich.	9	----	9
33	Martha	m	l	sh o	r	y g	g	m Sept.	Mo.	4	----	6
34	Massasoit, *Rog. 3*	m	l	s sh	r	r	g	m Sept.	h Mass.	7	----	7
35	McPike	m	l	c sh	r ov	r	v g	b Sept.	Ill.	9	----	9
36	Merrimac, *Rog. 19*	l	l	s b c	r	b	g	m Sept.	h Mass.	6	----	6
37	Michigan	m	m	l	r	g w	v g	m Sept.	Mich.	6	----	----
38	Mills	......	......	......	......	b	v g	e Sept.	N. Y.	8	----	8
39	Moore Early	l	l	c sh	r	b	v g	b Sept.	Mass.	6	----	8
40	Moyer	s	s	c sh	r	w	v g	b Sept.	Ont.	8	----	7
41	Niagara	l	m	c sh	r	g y w	v g	m Sept.	N. Y.	8	----	10
42	Pocklington	l	l	l sh	r	y	v g	e Sept.	N. Y.	7	----	8
43	Requa, *Rog. 28*	l	l	s o	r	r	g	m Sept.	h Mass.	7	----	7
44	Salem, *Rog. 53*	l	l	s b c	r	d r	g	e Sept.	h Mass.	7	----	8
45	Telegraph, *Christine*	l	l	c	r	b	g	m Sept.	Penn.	5	----	7
46	Ulster	l	l	sh	r	r	b	m Sept.	N. Y.	9	----	9
47	Vergennes	m	l	o s	r	r	v g	b Sept.	Ver.	7	----	7
48	Victor	s	s	c sh	r	b	v g	b Sept.	Kan.	8	----	7
49	Wilder, *Rog. 4*	l	l	c sh	r	b	v g	m Sept.	h Mass.	7	----	8
50	Winchell	m	m	sh	r	w	b	b m Sept.	Ver.	10	----	10
51	Woodruff	s b	l	sh	r	r	v g	m Sept.	Mich.	6	----	7
52	Worden	l	l	c sh	r	b	v g	m Sept.	N. Y.	8	----	10
53	Wyoming	s	m	c	m	b r	v g	m Sept.	N. Y.	4	----	6

SECTION IX.—GRAPES.—NATIVE.

ABBREVIATIONS FOR THIS SECTION.

Color.

a. amber.
b. black.
d. dark.
g. greenish.
l. light.
li. lilac.
p. purple.
r. reddish.
w. whitish.
y. yellowish.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore.	Northern lake shore.	
1	----	----	----	----	----	Subject to mildew of the foliage. Rarely successful.
2	*	*	*	*	----	Keeps well after gathering.
3	*	*	**	**	*	Very well esteemed by those who have fruited it. Excellent keeper.
4	*?	*	*?	*	----	One of Rogers' very numerous hybrids. Inclined to mildew.
5	†	†	†	†	†	Worthy of trial.
6	**	**	**	*	*	One fourth foreign. Highly satisfactory. Needs pollenizing.
7	†	†	†	†	†	Promising for home use or market.
8	*?	----	*?	*?	---	It is yet one of the best in localities where the season is long enough to ripen it. Good two years out of three at the south.
9	----	----	----	----	----	Very early, vigorous and productive, but its poor quality condemns it.
10	----	----	-	--	----	Is seldom good or even passable till ripened by frost.
11	**	**	**	**	**	Here, as elsewhere, this is the "grape for the million."
12	*?	*?	*?	*?	----	Seedling from Concord, by E. W. Bull. Far from satisfactory.
13	**	**	**	**	**	Slow grower. Fully as productive as Concord when well established.
14	**	**	**	**	----	Vigorous, healthy; promising as a variety for amateurs.
15	*?	*?	*	*	----	Rather foxy, with a thick, tough skin. One of the best keepers. A thin bearer on strong soils. Better on dry, warm soils.
16	*?	*?	*?	*?	----	Very large in both bunch and berry—market.
17	*	*	*	*	----	Promises well for both dessert and market.
18	----	----	*?	*?	----	Rather late for even southern Michigan.
19	----	*?	----	---	*?	Still prominent as one of the hardiest and most productive for early market; but very liable to drop its berries. Generally discarded.
20	*	*	*	*	*	Vigorous, hardy. Of fine quality. Valuable for amateurs.
21	----	*?	*?	*?	----	Another of the Massachusetts hybrids, of fair quality.
22	†	†	†	†	†	Promising for market.
23	----	*?	*?	*?	----	Generally esteemed as the finest of our natives. The vine seems to lack constitution, and is not generally successful.
24	---	----	*?	*?	----	An old favorite. Still popular where it is sure to ripen. Is not generally successful.
25	--	*?	*?	*?	----	Valued for hardiness, vigor and productiveness. A good wine grape.
26	*?	*?	*?	*?	*	Hardy and vigorous. Ripens with Concord.
27	---	*?	*?	*?	----	Vine hardy, productive. Not satisfactory in some localities.
28	†	†	*?	*?	----	Promising early dessert grape.
29	*	*	*	*	*	Seedling of Concord, and as hardy and healthy; but not as vigorous and productive. Quality superior.
30	----	----	*?	*?	----	Valuable in locations where it will ripen. Ripens with Isabella.
31	*	*	*	**	*	A vigorous and productive vine. But little grown in this State. Worthy.
32	†	†	†	†	†	Vigorous, healthy and productive. Promising.
33	*?	*?	*?	*?	*?	Much sought for on account of its color. Very sweet but too foxy.
34	*	*	*	*	*?	Moderately vigorous and productive; like other hybrids, liable to mildew.
35	†	†	†	†	†	Of fine appearance. Promising.
36	*	*	*	*	*	Vigorous and prolific. Much like Wilder in quality and season.
37	†	†	†	†	†	Worthy of trial.
38	*?	*?	*?	*?	----	A good dessert grape. May prove profitable.
39	*	**	*	*	**	Vigorous grower. Excellent; especially for the north.
40	*?	*?	*?	*?	*?	Much like Delaware, but less sprightly in flavor.
41	**	**	**	**	*	A promising white, market grape. Very vigorous, healthy and productive.
42	*	*	*	*	----	Hardy, beautiful. Rather late.
43	*?	*?	*?	*?	----	Promising here, but requires further trial.
44	*	**	**	**	*	The largest, most attractive and popular of the Rogers' hybrids. Vigorous, productive. Bunches often imperfect. Mildews.
45	*?	*?	*?	*?	*	Hardy and vigorous. Ripening with Hartford and similar in quality.
46	*	*	*	*	*	Hardy, productive. Promises superior excellence.
47	*	*	*	*	*?	Hardy. Ripens with Concord. Not of high quality.
48	*	*	*?	*?	*	A promising very early dessert variety.
49	*	*	*	*	*?	One of the finest and most popular of the Rogers' hybrids. Will do for market.
50	**	**	**	**	**	The finest of the early white grapes. Green Mountain is identical with it.
51	*?	*?	*?	*?	*?	Hardy, vigorous. A market grape only.
52	**	**	**	**	**	A week earlier than Concord and better in quality. Very desirable.
53	----	----	----	----	----	Showy, but not desirable.

SECTION X.—PEACHES.

ABBREVIATIONS FOR THIS SECTION.

Form.		Color.		Flowers.	Glands.
c. compressed.	ov. oval.	b. bright.	p. purple	l. large.	g. globose.
d. depressed.	r. round.	c. crimson.	r. red.	s. small.	o. obscure.
o. oblong.		d. dark.	w. white.		r. reniform.
		g. green.	y. yellow.		s. serrate.
		o. orange.			

Number.	Names.	Descriptions.									Use and value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Flowers.	Glands.	Adhesion.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Alberge	m	r	y p r	g	s	g	f	e Aug.	Fr.	6	----	8
2	Alexander	m	r	g w r	v g	l	g	c f	e July.	Ill.	7	----	9
3	Amsden	m	r	g w r	v g	l	g	c f	e July.	Mo.	7	----	9
4	Barnard	m l	r	y d r	g	s	r o	f	b Sept.	Am.	7	7	9
5	Beers Smock	l	ov	y r	g	s	r	f	m Oct.	Am.	6	9	9
6	Chili, *Hill's*	m	ov c	y d r	g	l	r	f	e Sept.	N. Y.	6	8	9
7	Conkling	m	r ov	y r	v g	s	r	f	m Sept.	--------	9	----	8
8	Coolidge	l	r	w c	v g	s	g	f	m Aug.	Mass.	9	----	7
9	Corner	l	------	--------	------	s	r	------	e Sept.	Mich.	----	----	----
10	Crawford, Early	l	o	y r	v g	s	g	f	e Aug.	N. J.	9	10	9
11	Crawford, Late	v l	r	y d r	v g	s	g	f	e Sept.	N. J.	8	10	9
12	Crosby	m	r	r y	g	s	r	f	m Sept.	Mass.	8	8	9
13	Druid Hill	l	r	g w r	b	s	g	f	e Sept.	Md.	10	----	7
14	Dumont	l	r	d y r	g	s	r	f	m Sept.	Mich.	8	7	8
15	Elberta	l	r o	r y	v g	s	r	f	b Sept.	Ga.	8	----	9
16	Engle (*Mammoth*)	l	r o	y r	v g	s	g	f	m Sept.	Mich.	8	9	9
17	Fitzgerald	l	r ov	y r	v g	s	g	f	b Sept.	Ont.	8	9	9
18	Foster	l	r d	d o r	v g	s	g	f	e Aug.	Mass.	8	8	9
19	George the Fourth	m	r	y w d r	b	s	g o	f	e Aug.	N. Y.	10	----	5
20	Gold Drop	m l	r ov	b y	v g	l	r	f	e Sept.	Mich?	7	9	10
21	Grosse Mignonne	l	r d	g y p r	b	l	g	f	e Aug.	Eur.	10	9	6
22	Hale	m	r	g w r	v g	l	g	f c	m Aug.	Ohio.	8	----	9
23	Heath Cling	l	o ov	y w r b	v g	s	r	c	b Oct.	Md.	9	9	7
24	Jacques	l	r c	d y r	v g	s	r	f	m Sept.	Mass.	7	9	9
25	Kalamazoo	l	r o	b y	v g	s	r	f	e Sept.	Mich.	8	9	10
26	Large Early York	m l	r	w r	v g	s	g	f	b Sept.	Am.	8	8	8
27	Lemon Cling	l	o	y r	v g	s	r	c	e Sept.	Am.	6	7	8
28	Lewis	l	r	w r	g	s	r	f	e Aug.	Mich.	8	8	9
29	Louise	m	r c	g w p r	v g	s	r	f	b Aug.	Eng.	8	----	8
30	Michigan	m l	r	w r	v g	s	r g	f	e Aug.	Mich.	8	8	10
31	Moore	l	r ov	w r	v g	s	g	f	b m Sept.	Mass.	8	6	8
32	Morris White	m	ov	g w p	v g	s	r	f	e Sept.	Am.	7	10	8
33	Mountain Rose	l	r c	w r	v g	s	g	f	b Sept.	N. J.	9	8	8
34	Newington, free	l	r c	y w r	b	s	g	f	e Aug.	Am.	10	----	7
35	Oldmixon Cling	l	r ov	y w r	b	s	g	c	m Sept.	Am.	8	9	7
36	Oldmixon Free	l	r ov	y w r	v g	s	g	f	m Sept.	Am.	8	8	9
37	Red Cheek	l	r ov	y b r	g	s	g	f	m Sept.	Am.	7	----	8
38	Reeves *Favorite*	l	r ov	y r	v g	s	g	f	b Sept.	N. J.	9	7	9
39	Richmond	m l	r c	y d r	v g	s	r	f	b Sept.	N. Y.	8	9	9
40	Rivers	l	r	y pink	b	l	r	f	m Aug.	Eng.	9	9	8
41	St. John *Crane's Early.*	l	r c	y r	v g	s	r	f	b Sept.	Am.	8	----	9
42	Salway	l	r d	y c r	v g	s	r	f	b Oct.	Eng.	8	9	8
43	Smock Free	l	ov c	o y d r	g	s	r	f	Oct.	N. J.	6	9	9
44	Snow Orange	m l	r	b y d r	v g	s	r	f	b Sept.	Mich.	6	7	9
45	Steadley	l	r ov	w r	v g	s	r	f	b Oct.	Am.	9	9	----
46	Stevens Rareripe	l	r ov	r w	v g	s	r	f	m Sept.	--------	8	8	9
47	Stump	v l	r o	w b r	v g	s	g	f	e Sept.	N. J.	8	8	8
48	Susquehanna	v l	r	y r	v g	s	r	f	m Sept.	Penn.	7	9	6
49	Switzerland	m	r	y r	v g	s	g	f	m Sept.	--------	7	8	9
50	Triumph	m	r	y w r	v g	s	g	f	e July	Ga.	8	7	7
51	Wager	m	o ov	y	v g	s	g	f	b Sept.	N. Y.	8	9	8
52	Yellow Rareripe	l	r o	o y r	v g	s	g	f	b Sept.	Am.	8	8	8

SECTION X.—PEACHES.

Since the peach is generally used in its fresh state, or for canning, which is only a mode of preserving it in a nearly fresh condition, we have generally omitted to give values in the column headed "cooking." Throughout Central Michigan, except in favorable localities, occasional severe winters prove fatal to the fruit buds of the peach, and sometimes even to the trees. These facts can not be properly expressed in the starring, and hence are disregarded.

Number.	Locality. East.	Center.	South.	Southern lake shore.	Northern lake shore.	Remarks.
1	*?	?	*?	*?	*?	This is one of the earliest of yellow-fleshed peaches, and only desirable for that reason.
2	*	*	*	*	*	A partial cling, much like its supposed parent, Hale, and two or three weeks earlier. Profitable for market.
3	*	*	*	*	*	Almost exactly like Alexander in tree, fruit and season of ripening.
4	*	**	*	**	**	When thoroughly thinned, size is large; often overbears, becoming small.
5	*	**	**	**	*	Preferred to Smock by some growers.
6	*	*	*	**	*	Hardy; a good bearer and a profitable late variety on young trees. Lacks quality. Losing reputation.
7	†	†	†	†	†	Worthy of planting.
8	*	*	*	*	*	One of the best pale-fleshed, early market peaches.
9	†	†	†	*	†	Grown and valued for market in Allegan county.
10	**	**	**	**	*	Very popular with both market men and fruit growers. Much used for canning. Best on heavy soil. Bloom tender, hence uncertain.
11	*	**	**	*	*	Lacks productiveness on light soils, and on young trees.
12	†	†	†	†	†	A hardy and promising market sort. High colored but only of medium size.
13	*	*	*	*	----	An excellent late pale-fleshed peach that should be better known.
14	.	----	----	*	..	Tree and buds hardy. Shipping qualities best.
15	**	**	**	**	**	Hardy, productive and brings the highest price. Injured by curl-leaf.
16	*	*	*	*	*	Promising. Hardier than Crawford.
17	†	†	†	†	†	A promising, hardy variety. Follows Crawford Early.
18	*	**	*	*	*	A good market peach, but almost identical in season with Early Crawford.
19	*?	*?	*?	*?	*?	One of the best for home use. Too tender and delicate for market.
20	**	**	**	**	*	Probably an unrecognized old variety. Largely grown for market.
21	*?	*?	*?	*?		The true variety is one of the most delicious of peaches.
22	**	**	**	**	**	A fine peach and a vigorous tree. Sometimes rots before maturity. By many highly esteemed for market. A semi-cling.
23	----	----	*?	*?	----	One of the finest clings, but needs a long season in this latitude. Very profitable when it ripens fully.
24	*	**	**	**	*	Profitable, but not of high quality.
25	**	**	**	**	*	Highly praised by all who have fruited it. Brunson is much like it.
26	*	**	*	*	*	Has not become generally popular in Michigan.
27	*?	*?	*?	*?	----	The largest and best of the yellow-fleshed clings. Does not sell well.
28	**	**	**	**	**	An Allegan county seedling. A very valuable market peach.
29	*?	*?	*?	*?	*?	Ripens in advance of Hale or Beatrice. Very high quality.
30	**	**	**	**	**	Worthy of extensive planting.
31	----	----	----	----	-	A beautiful and promising peach. May be valuable for market if productive.
32	*	*	*	*	*	Valued for preserving and canning on account of its color.
33	*	*	**	**	**	A valuable market variety. Highly prized where fully proved.
34	*?	*?	*?	*?	*?	Sometimes clings slightly. A fine amateur peach. Fruit large and beautiful.
35	*?	*?	*?	*?	*?	Where a cling is desired, this is one of the finest of its season.
36	*	*	**	**	**	A very old variety which still holds a high position as a market peach.
37	*	*	*	*	*	An old sort. The parent of Crawford's Early and Late.
38	*	*	*	*	*	Generally succeeds well.
39	*	*	*	*	*	A new and valuable variety. A few days later than Early Crawford, and less acid.
40	*	*	*	*	*	An excellent early sort; lacks color. Fruit large and beautiful.
41	*	**	**	**	*	Identical with Flater's St. John, Crane's Early and Yellow St. John.
42	----	----	*	*	----	Will only ripen at the south with certainty; fails in unfavorable seasons.
43	*	**	**	**	-	One of the latest profitable market peaches in Southern Michigan. Valuable
44	*	*	*	*?	*?	Similar to Barnard; bright in color, and slightly later. Must be thinned to insure good size.
45	----	----	----	----	----	Excellent for either dessert or canning.
46	*	*	*	*	*	A promising market peach.
47	*	*	*	*	*	A large and beautiful market peach of fair quality. Very profitable.
48	*?	*?	*?	*?	*?	Seldom productive enough for market.
49	*?	*?	*?	*?	----	A large, beautiful and fine, rather late peach.
50	†	†	†	†	†	A seedling of Early Michigan and a promising early yellow variety.
51	*?	*?	*?	*?	*?	Said to be the most profitable variety in Mason county.
52	*	*	*	*	*	The genuine is a fine early peach.

NOTES ON FRUITS

NOTES ON VARIETIES OF GRAPES.

Concord has, in most parts of the state, been very largely planted both for home use and market but there are other kinds that may be profitably grown for either purpose. Among the other well known black varieties are Worden and Moore *Early*, while Campbell *Early*, a recently introduced variety from Ohio, bids fair to take a high place in the list, owing to its strength of plant, earliness, large size, firm skin and high flavor of its fruit, which hangs well to the stem, making it a long keeping and good shipping variety, while the seeds separate freely from the pulp, it becomes a very desirable kind. Thus far it seems to be little subject to disease. Of the red varieties Delaware and Brighton are among the best, although Vergennes and Diana are excellent on account of their keeping quality. As an early white grape Winchell has no superior, but Moore Diamond and Niagara can generally be grown successfully. Where fungous diseases prevail they can generally be held in check by means of repeated sprayings with Bordeaux mixture.

NOTES ON VARIETIES OF PEACHES.

When selecting varieties either for home use or market, it is desirable to secure a succession in ripening and for this purpose, for the most part, varieties adapted to one purpose can be used for the other. For nearly all parts of the state a good selection would be Alexander, Rivers, Hale, Lewis or Early Michigan, St. John, Barnard, Elberta, Engle Mammot, Kalamazoo, and Smock. Hills Chili is desirable in some of the northern counties; Gold Drop is a very hardy and productive variety, but unless the fruit is well thinned it is likely to be small. Among the promising new kinds are Triumph, an early yellow fleshed variety, ripening soon after Alexander, which it resembles in size; when fully ripe it is a freestone and although not thoroughly tested it promises to be a good early sort. Fitzgerald is another recent candidate for favor and seems to be a very hardy and productive variety, of good size, flavor and color, ripening soon after the Crawford. The Crawfords have not been included in the above list because in many sections, particularly upon the light soil along the lake shore, the buds set early and are likely to be injured by the early frosts, but upon high and well drained spots and upon rather heavy soil, they succeed better than most varieties.

NOTES ON VARIETIES OF PEARS.

As a selection for home use good results will be obtained from the following varieties: Summer Doyenne, Bloodgood, Clapp Favorite, Bartlett, Flemish Beauty, Bosc, Howell, Seckel, Sheldon, Clairgeau, Anjou, Lawrence, Winter Nelis, Easter Beurre,—as standards, and Angouleme and Louise Bonne as dwarfs. Several of the kinds given as standards can be used as dwarfs; among them are Seckel, Anjou, Bartlett and

Howell. Of the above kinds a few of them should be largely planted for maket purposes and these should be selected from Bartlett, Howell, Clairgeau, Anjou, Lawrence, Angouleme and Louise Bonne. On warm rich soil in the southern part of the state Kieffer does well and, when well ripened, they find ready sale for canning purposes. Onondaga is also of value as it follows the Bartlett and can take the place of that variety.

On rich, deep, loamy soils, dwarf pears give good results, provided the growth is severely cut back each year and an abundance of plant food is furnished.

NOTES ON VARIETIES OF PLUMS.

Until recently the varieties of plums commonly in cultivation were of European origin, but recently a number of Japanese varieties have been introduced and very many kinds seem to be of value. None of these kinds thrive in the northern part of the state but several of the American varieties are quite promising for that section. Among the best of the European kinds are Bradshaw, Lombard, German Prune, Gueii, Union Purple, Quackenboss, Bavay, Coe Golden Drop, Grand Duke, Black Diamond, Kingston, Stanton and Copper. Most of the Japanese kinds ripen rather early in the season and the trees are usually productive bearers and comparatively free from fungous diseases, and, although they are not proof against curculio, are less injured than the European kinds; their worst fault is that their blossom buds start early and are likely to be injured by the frost, while most of them are inferior to the European kinds in quality. Among the best are Red June, Abundance, Burbank and Satsuma, while Wickson, a variety recently introduced, promises to be particularly valuable provided it is sufficiently hardy. A large number of American varieties have been propagated in the north-west where other kinds cannot be grown, and in many sections of this State they will be found valuable, both for home use and market, but will generally be less desirable than the European kinds where the latter can be successfully grown.

SECTION XI.—PEARS.

ABBREVIATIONS FOR THIS SECTION.

Form.

a. acute.
d. depressed.
e. elongated.
o. oblong.
ob. obtuse.
obo. obovate.
ov. oval or ovate.
p. pyriform.
r. roundish.
t. turbinate.

Number.	Names.	Descriptions.						Use and value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Angouleme, *Duchess de*	v l	o obo	g y ru	v g	Oct.	Fr.	7	9	10
2	Anjou	l	ob p	g ru c b	v g	Nov.	Fr.	9	9	10
3	Bartlett	l	o ob p	y ru r	v g	Sept.	Eng.	8	10	10
4	Bloodgood	m	t obo	y ru	v g	Aug.	N. Y.	9	6	4
5	Bosc	l	p	d y ru r	b	Oct.	Bel.	9	8	9
6	Boussock	l	obo p	d y ru	v g	Sept. Oct.	Bel.	7	7	8
7	Brandywine	m	e ob p	y g ru r	v g	b Sept.	Penn.	7	7	5
8	Buffum	m	ob obo	d y r	v g	Sept.	R. I.	6	7	6
9	Clairgeau	l	p	y oc ru	g	Oct. Nov.	Fr.	6	7	9
10	Clapp *Favorite*	l	obo ob p	l c y	v g	Sept.	Mass.	8	8	9
11	Columbia	l	o obo	g y o	g	Nov. Jan.	N. Y.	7	8	6
12	Comice, *Doyenne du*	l	r ob p	y c ru	b	Oct. Nov.	Fr.	9	7	7
13	Dana Hovey	s	obo ob p	g y ru	b	Nov. Jan.	Mass.	9	5	5
14	Dearborn	s	r p	ly	v g	Aug.	Mass.	7	5	3
15	Diel	l	obo ob p	y o ru b	v g	Sept. Dec.	Bel.	6	8	7
16	Easter *Beurre*	l	r obo ob	y g ru b	v g	Jan. Mar.	Eur.	6	8	3
17	Flemish Beauty	l	obo ob p	y ru r b	v g	Sept.	Bel.	7	7	8
18	Giffard	m	p	g y r	v g	e Aug.	Fr.	10	6	6
19	Glout Morceau	l	obo ob p	g y b	g	Dec.	Fr.	7	7	5
20	Gray Doyenne	m	o obo	l ru	b	Oct.	Eur.	9	8	8
21	Hardy *Beurre*	l	obo ob p	g ru b	v g	Sept. Oct.	....	7	7	8
22	Heyst *Emile d'*	l	o oto p	y o ru	b	Nov. Dec.	Bel.	10	8	8
23	Howell	l	r p	l y ru	v g	Oct.	Conn.	8	7	8
24	Idaho	l	r ob obo	g y ru	v g	Oct.	Idaho.	8	8	....
25	Kieffer	l	r ob p	y r	g	Nov.	Am.	3	8	9
26	Lawrence	m	obo ob p	y ru	v g	Dec.	N. Y.	6	8	8
27	Louise *Bonne of Jersey*	l	o p	g b r	v g	Sept. Oct	Fr.	7	9	8
28	Lucrative	m	obo ob p	y g ru	b	Sept.	Fr.	10	8	8
29	Madeline	m	obo p	y g b	v g	July.	Fr.	8	8	7
30	Malines, *Josephine of*	m	r ob p	g y ru	v g	Jan. Feb.	Bel.	6	7	8
31	Manning, *Elizabeth*	s	obo ob p	l y r	v g	Aug Sept.	Bel.	9	7	6
32	Mount Vernon	m l	r ob p	ru y b r	v g	Nov. Dec.	Mass.	8	8	6
33	Napoleon	l	ob p	y g	g	Sept.	Bel.	5	6	6
34	Onondaga	l	obo ob p	y ru	v g	Oct. Nov.	Conn.	7	8	9
35	Osband *Summer*	s	r ov ob op	y r ru	v g	Aug.	N. Y.	7	7	8
36	Paradise *of Autumn*	l	o oto a p	y ru	v g	Sept. Oct.	Bel.	8	6	4
37	Pound	l	p	y g b	g	Dec. Mar.	Eur.?	1	8	7
38	Reeder	s m	r ob p	y ru	b	Nov.	N. Y.	9	8	5
39	Rosteizer	s	obo o p	y g r b	b	Aug.	Eur.	9	5	6
40	Seckel	s	obo	y b r ru	b	Oct.	Penn.	10	....	7
41	Sheldon	m	r ob obo	g y ru c	v g	Oct.	N. Y.	8	8	9
42	Souvenir *du Congres*	l	p r	y g	v g	Sept.	Fr.	8	8	9
43	Sterling	m	r ov p	y ru c	v g	Sept.	N. Y.	7	5	9
44	Stevens	l	r	y	v g	Sept.	N. Y.	9	6	6
45	Summer Doyenne *Doyenne d' Ete.*	s	r obo p	y r	v g	July.	Bel.	9	5	8
46	Superfine	m	r p	y c ru	v g	Oct.	Fr.	7	8	8
47	Tyson	m s	a p	y ru c	b	Aug. Sept.	Penn.	9	6	7
48	Urbaniste	m l	obo	y ru	v g	Oct. Nov.	Fl.	9	7	6
49	Vermont Beauty	m	obo p	y r	v g	Sept.	Vt.	9	7	8
50	Vicar	l	l p	y b	b	Nov. Jan.	Fr.	4	8	6
51	White Doyenne	m l	obo	y r	b	Oct.	Fr.	10	7	7
52	Wilder *Early*	s	obo	y br ru	v g	Sept.	Am.	9	....	....
53	Winter Nelis	m	r obo	y g ru	b	Dec. Jan.	Fl.	9	7	7

SECTION XI—PEARS.

ABBREVIATIONS FOR THIS SECTION.

Color.

b. brown.	d. dark.	l. light.	r. red.	y. yellow.
c. crimson.	g. green.	o. orange.	ru. russet.	

Number.	Locality. East.	Center.	South.	Southern lake shore.	Northern lake shore.	Remarks.
1	**	**	**	**	*	When neglected proves unproductive. Profitable under good treatment, and on dwarf stocks. At north loses quality.
2	**	**	**	**	*	One of the best late autumn pears, whether for market or home use.
3	**	**	**	**	**	The leading market sort. Too musky to suit some tastes.
4	*?	*?	*?	*?	*?	No garden should be without this. Fruit best when house ripened.
5	**	**	**	**	**	Fruit fair and even in size. Will bear to be planted for market.
6	*	*	*	*	*	Popular as a market pear. Also a good amateur fruit.
7	*?	*?	*?	*?	*?	But little disseminated. A good early amateur pear.
8	*	*	*	*	*	Popular on account of the health, vigor, and productiveness of the tree. Market.
9	*	*	*	**	*	Soon becomes dry and insipid, after ripening. A showy market pear.
10	**	**	**	*	*	A strong grower. Fine large fruit. Inclined to rot at the core. A good market pear if gathered early.
11	*?	*?	----	----	----	Liable to drop or be blown from the tree prematurely.
12	*?	*?	*?	*?		New; gives promise of value.
13	*?	*?	*?	*?	*?	One of the few winter pears of high quality.
14	----				----	Well known and esteemed, but too small to become very popular.
15	*?	*?	*?	*?	*?	Fruit apt to be astringent on young trees. Should be house-ripened.
16	----	----	----	----	----	In a warm exposure and favorable season, this will be found satisfactory. Better south.
17	*	**	*	*	*	Vigorous tree. Large, showy fruit, which decays soon at the center. Drops, and sometimes scabs or spots.
18	*?	*?	*?	*?	*?	Fruit requires to be gathered before maturity—decays rapidly.
19	----	----		----	----	On old trees, when well ripened, this is an excellent pear.
20	*?	*?	*?	*?	*?	Excellent for the amateur.
21	*	*	*?	*	*?	Not as well known as it should be.
22	*?	*?	*?	*?	*?	Little disseminated. A fruit of high quality.
23	*	*	**	**	*	Quite freely planted and generally esteemed.
24	†	†	†	†	†	Promising. Much like Sheldon.
25	*	*	*	*	----	In this climate only valued for market and canning and that only at the south, but when well grown it is a very profitable variety.
26	*	*	*	*	*	Tree healthy and vigorous. Should be grown on dry, warm soils.
27	*	*	**	*	*	A good market pear. Should always be grown as a dwarf.
28	*	*	*	*	*	An excellent and profitable old variety.
29	*	*	*	*	----	The earliest pear of good quality. Sometimes slightly astringent.
30	*	*	*	*	*	Not as freely planted as it should be.
31	*	*	*	*	----	One of the most desirable amateur pears of its season.
32	*	*	*	*	*	A promising late autumn and early winter pear. Bears young.
33	*	*	*	*	----	An early and abundant bearer. Lacks quality.
34	*	**	*	**	*	A good, constant bearer of large, showy fruit of fair quality in most seasons.
35	*	*	*	*	*	Tree vigorous, productive. Fruit sufficiently good for the market.
36	----	----	----	----	----	Fruit somewhat like Beurre Bosc, but more variable.
37	----	----	----	----	----	Chiefly valued for the kitchen. Trees strong, healthy.
38	*?	*?	*?	*?	----	A New York seedling from Winter Nelis.
39	*?	*?	*?	*?	*?	Tree vigorous and productive. Fruit excellent, but unattractive in appearance.
40	*	**	**	**	**	The standard of high quality among pears. Tree forms a beautiful pyramid. Profitable when buyers come to know it.
41	*	*	*	*	*	A hardy, productive tree; and a good fruit for general purposes; not attractive in appearance.
42	*	*	*	*	*	Very large and beautiful. Variable in size. Not of high quality.
43	*	*	*	*	*	Both tree and fruit well adapted for the market.
44	*?	*?	*?	*?	*?	An excellent and fine looking pear, but soon decays at the core.
45	**	**	**	**	**	The best and most satisfactory very early pear. Valued for early market.
46	*	*	*	*	*	A fine pear. Sometimes a little too acid. Productive.
47	*	*	*	*	*	A beautiful tree. Fruit grown to some extent for the market. A tardy bearer.
48	----	----	----	----	----	Too tardy a bearer. Is being abandoned; probably for this reason.
49	†	†	†	†	†	Quite productive; fruit handsome and of good quality.
50	*?	*?	*?	*?	*?	Tree vigorous and productive; its greatest recommendation for this climate.
51	----	----	----	----	----	This old favorite is seldom successful in this State as it scabs and cracks.
52	†	†	†	†	†	Much like Seckel but earlier.
53	*	*	*	*	*	The fruit if well grown and ripened, is scarcely inferior to the Seckel. The tree must not be allowed to overbear.

SECTION XII.—PLUMS.

In the grading and starring of plums no reference is made to the prevalence of the curculio in the district; nor yet to the tendency of the variety to the premature rotting of the fruit or loss of foliage.

ABBREVIATIONS FOR THIS SECTION.

Form.

d. depressed. ob. oblate. l. long. obo. obovate.
n. necked. ov. oval. o. oblong. r. roundish.

Number.	Names.	Descriptions.							Use and value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Adhesion.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Aubert, Yellow	l	o	y	g	f	Aug.	Eur.	8	9	9
2	Abundance	m	r ov	r	g	f c	Aug.	Jap.	8	8	9
3	Bavay, *Green Gage*	l	r d	g y	b	f	Oct.	Bel.	9	9	9
4	Bleecker	m	r ov	y	v g	f c	e Aug.	N. Y.	8	7	8
5	Botan	m	r ov	y	g	f c	Aug	Jap.	8	8	8
6	Bradshaw	l	ov obo n	r p	g	c f	e Aug.	Am.	7	10	10
7	Burbank	l	r	p y	g	------	Aug.	Cal.	6	9	10
8	Canada Egg [local name]	l	--------	--------	g	c	m Aug.	Ont.	7	7	8
9	Chabot	l	r o	y r	g	c f	Aug.	Jap.	6	7	7
10	Copper	m s	ov n	c b	g	c	e Sept.	Eur.	4	8	9
11	Damson	s	ov	b p	g	f c	Sept.	Am.	3	10	7
12	Diamond, *Black*	v l	ov	b	g	f	e Sept.	--------	8	10	10
13	Duane, *Purple*	v l	o ov	r p	g	f c	m Aug.	N. Y.	7	4	6
14	Englebert	l	ob ov	p br	v g	f	b Sept.	Bel.	8	8	10
15	Fellenburg, *Italian Prune*	m	ov	b	g	f	b Oct.	Eur.	6	8	8
16	Field	l	r ov n	r p	g	c f	m Aug.	Am.	7	10	10
17	General Hand	v l	r ov	g	g	f	Sept.	Penn.?	6	7	7
18	German *Prune*	l	l ov	b p	g	f	Sept.	Eur.	6	9	9
19	Golden Drop, *Coe*	l	ov n	y	v g	c	e Sept.	Eng.	8	8	9
20	Grand Duke	l	r ov	p	v g	f c	Sept.	Eur.	8	10	10
21	Green Gage	s	r	g y r	b	f	e Aug.	Eur.	10	8	5
22	Gueii	l	l ov	r p	g	f c	m Sept.	N. Y.	6	10	10
23	Huling's, *Superb*	v l	r ov	g y	g	c	e Aug.	Penn.	8	7	5
24	Imperial, *Gage*	------	--------	g y	b	f	b Sept.	N. Y.	9	9	8
25	Jefferson	l	ov	y p r	b	f	b Sept.	N. Y.	10	9	9
26	Kingston	v l	ov	b	v g	f	e Sept.	Eur.	8	10	10
27	Lawrence, *Favorite*	l	r ob	y g	b	f	m Aug.	N. Y.	10	----	----
28	Lombard	m	r ov d	r p	g	c	b Sept.	N. Y.	6	10	9
29	McLaughlin	l	r ob d	y r	b	c	e Aug.	Me.	10	6	7
30	Miner	m	l r	p r	g	c	b Oct.	Penn.	6	6	4?
31	Orleans	m	r	r p	g	f	e Aug.	Eur.	----	----	----
32	Peach	v l	r d	b r	g	f	b Aug.	Eur.	6	7	7
33	Pond, *Fonthill*	v l	ov n	y r	g	c	m Sept.	Eng.	6	7	10
34	Prince, *Yellow*	m l	ov	y	v g	f	b Aug.	N. Y.	8	8	9
35	Quackenboss	l	o r	p	g	f c	Sept.	N. Y.	6	7	9
36	Red June	l	ov	r	g	c	b Aug.	Jap.	6	9	9
37	Red Magnum Bonum	l	ov	r	g	f	b Sept.	Eur.	5	7	7
38	Red Nagate	l	ov	r	g	c	e Aug.	Jap.	6	9	9
39	Satsuma	l	r	d r	g	c	e Sept.	Jap.	2	9	7
40	Shropshire, *Damson*	s	ov	d p	g	f c	e Sept.	Eng.	4	10	8
41	Smith Orleans	l	ov	r p	v g	c	e Aug.	N. Y.	8	8	8
42	Stanton	m	r ov	d p	g	f c	e Sept.	Eur.	8	8	9
43	Washington	v l	r ov	g y c	v g	f	e Aug.	N. Y.	8	10	7
44	Wickson	v l	ov n	r	g	f	e Aug.	Cal.	8	9	9
45	Wild Goose	m	r ov	p	g	c	e July.	Tenn.?	6	5	----
46	Yellow Egg	v	ov	y	g	c	e Aug.	----------	6	8	7

SECTION XII.—PLUMS.

ABBREVIATIONS FOR THIS SECTION.

Color.

b. blue.	br. brownish.	p. purple.	r. red.
c. copper.	y. yellow.		g. green.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore.	Northern lake shore.	
1	†	†	†	†	†	A promising kind introduced by Prof. Budd.
2	*	*	*	**	*	Very productive. One of the hardiest of its class.
3	*	*	*	*	*	Nearly or quite as fine as Green Gage. Tree a better grower.
4	*	*	**	*	*	Hardy. A good regular bearer. Shoots downy.
5	*?	*?	*?	*?	---	Similar to Abundance except in color.
6	*	**	**	**	**	Grows and bears well. A superior market variety.
7	**	**	**	**	**	A valuable Japanese variety.
8	--	*?	----	*?	*?	Probably an unrecognized old variety. Very hardy and productive.
9	†	†	†	†	†	Worthy of trial.
10	*?	*?	*?	*?	*?	Valued for market and cooking.
11	*	*	**	**	*	A slow grower. Productive. Valued for preserves. Nearly free from rot.
12	**	**	**	**	**	A large handsome late plum, productive and of good quality.
13	*	*	*	*	*	Too soft and uneven in size for market.
14	*	**	*	*	**	Tree a great bearer. Valuable for market.
15	*	*	*	*	*	Tree vigorous, spreading, branches smooth.
16	†	†	†	†	†	Promising, as it ripens ten days earlier than Bradshaw.
17	--	----	----	*?	*?	Does not succeed well in Mason county.
18	*	*	*	**	**	Valued for drying and preserving.
19	**	**	**	**	**	Beautiful. Excellent. Perhaps may not ripen with certainty at the extreme north.
20	**	**	**	**	**	New. Wherever tested it has made an excellent showing.
21	*	*	*	*	*?	The standard of quality among plums. Tree a slow grower.
22	**	**	**	**	**	One of the most valuable of the new plums.
23	*?	*?	----	*?	*?	Tree very vigorous, upright, moderate bearer.
24	*	*	*	*	*	Productive, excellent; shoots dark, downy, vigorous.
25	*?	*?	*?	*?	*?	A slow grower, good bearer. Profitable at the north.
26	**	**	**	**	**	An early bearer. Very productive. Valuable.
27	*?	*?	*?	*?	*?	A seedling from Green Gage. Productive.
28	**	**	**	*	**	Tree vigorous, hardy and productive. The leading market variety. Too much grown to be profitable.
29	*	*	*	*	*	Nearly or quite equal to Green Gage. Hardy, vigorous, productive.
30	*?	*?	*?	*?	*?	Comparatively unproductive if standing alone. Very hardy. One of the best of the Americana species.
31	*?	----	*?	*?	*?	Vigorous. Branches gray and very downy.
32		--	--	*?	*?	Tree upright, vigorous. A moderate bearer.
33	**	**	**	**	**	Productive, vigorous. Branches smooth, grayish.
34	*?	*?	*?	*?	*?	An old favorite. Hardy, productive.
35	*	**	*	*	**	A rapid, upright grower; productive.
36	†	†	†	†	†	Worthy of extensive trial.
37	*	*	*	*	**	The genuine has slender, smooth shoots.
38	†	†	†	†	†	Resembles Red June, but later.
39	†	†	†	†	†	Productive. Valuable for canning. Buds tender.
40	*	**	*	**	**	Better than Damson for market.
41	*	*	*	*	*	One of the most vigorous; shoots glossy, reddish purple; very productive.
42	†	†	†	†	†	Worthy of trial as a late sort.
43	*	**	*	*	**	One of the largest and most beautiful, but inclined to rot on the tree.
44	†	†	†	†	†	One of the best of the Japan plums.
45	*?	*?	*?	*?	*?	An uncertain bearer at the north; probably from imperfect pollenization. A variety of the *chicasa* species.
46	*	*	*	*	**	A fine market variety, but rots in some seasons at the south.

SECTION XIII.—QUINCES.

ABBREVIATIONS FOR THIS SECTION.

Form.

ob. obtuse. p. pyriform. r. round.

Number.	Names.	Descriptions.						Use and value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Champion	vl	ob p	y	v g	Nov.	Am.	----	8	8
2	Meech	l	r ob p	y	v g	Oct. Nov.	N. J.	---	10	10
3	Orange, *Apple*	l	r p	y	v g	Oct. Nov.	Eur.	----	10	10
4	Rea	m	r ob p	y	g	Oct.	N. Y.	----	10	10

SECTION XIV.—RASPBERRIES.—RUBUS OCCIDENTALIS AND SUPPOSED HYBRIDS ROOTING FROM THE TIPS OF THE BRANCHES.

ABBREVIATIONS FOR THIS SECTION.

Form.

c. conical. ob. obtuse. r. roundish.

Number.	Names.	Descriptions.						Use and value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Caroline	m	r	o y	v g	m July.	N. Y.	9	9	6
2	Columbian, (*Red*)	v l	r	p r	v g	e July.	N. Y.	8	10	10
3	Conrath	m l	r	b	v g	b July.	Mich.	8	9	9
4	Doolittle, *American Black*	s	r	b	g	m July.	N. Y.	5	7	7
5	Earhart	m	r	b	v g	July, Oct.	Conn.	9	7	4
6	Eureka	l	r	b	v g	m July.	Ohio.	8	8	9
7	Gregg	v l	r	b	v g	m July.	Ind.	7	9	10
8	Hilborn	v l	r	b	v g	m July.	Ont.	9	9	10
9	Johnston *Sweet*	m	r	b	g	b July.	N. Y.	4	4	7
10	Kansas	m l	r	b	v g	b July.	Kan.	8	9	9
11	Mammoth Cluster, *McCormick*	m l	ob c	b	v g	July, Aug.	Am.	6	9	9
12	Muskingum (*Hybrid?*)	l	r	p r	v g	m July.	Ohio.	8	9	8
13	Nemaha	l	r ob	b	g	m July.	Neb.	5	5	9
14	Ohio	l	r	b	g	m e July.	Ohio.	8	9	9
15	Palmer	m	r	b	v g	b July.	Ohio.	8	9	9
16	Shaffer (*Hybrid?*)	l	r	p r	v g	m e July.	N. Y.	8	10	8
17	Souhegan, *Tyler*	m	r	b	g	b m July.	N. H.	8	9	8

SECTION XIII.—QUINCES.

ABBREVIATIONS FOR THIS SECTION.

Color.

y. yellow.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore.	Northern lake shore.	
1	*	*	*	*	....	An early and prolific bearer. Very downy. Very late.
2	*	*	*	*	....	Said to be very productive and of superior quality.
3	**	**	**	**	*	Well known and universally approved.
4	*	*	*	*	....	Larger than the Orange and equally good. Tree thrifty.

SECTION XIV. RASPBERRIES.—RUBUS OCCIDENTALIS AND SUPPOSED HYBRIDS—ROOTING FROM THE TIPS OF THE BRANCHES.

ABBREVIATIONS FOR THIS SECTION.

Color.

b. black. p. purple. r. red. y. yellow.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore.	Northern lake shore.	
1	*?	*?	*?	*?	*?	Supposed hybrid between Idæus and Occidentalis. A family berry.
2	**	**	**	**	**	Hardier, healthier and fruit firmer and of better quality than Shaffer.
3	**	**	**	**	**	One of the most promising of the early sorts.
4	*	*	*	*	*	Desirable when great hardiness is required. A little better than Souhegan.
5	*?	*?	*?	*?	*?	Fruits on new canes till killed by frosts.
6	**	**	**	**	**	One of the best medium season sorts.
7	**	**	**	**	*	Larger than McCormick. Is now the leading Black Cap.
8	*	*	*	*	*	Nearly as large as Gregg; better in flavor, and clear black in color.
9	*?	*?	*?	*?	*?	Very seedy. For this reason profitable for drying.
10	**	**	**	**	*	One of the largest medium season black caps
11	*	*	*	*	....	Plant very vigorous with stout thorns. Very productive. Formerly very popular.
12	*	*	*	*	*	Apparently an improvement upon Shaffer. Fruit firmer.
13	*	**	*	**	**	Much like Gregg, and by some thought to be hardier.
14	*	*	*	*	*	A profitable market variety; good for drying. Very hardy.
15	**	**	**	**	**	The best early Black Cap.
16	*	**	*	*	*	Enormous grower and bearer. Fruits ripen in succession. Superior for canning.
17	*	*	*	*	*	A good, early, market Black Cap.

SECTION XV.—RASPBERRIES.—RUBUS IDÆUS AND STRIGOSUS, INCREASING BY SUCKERS OR SPROUTS.

ABBREVIATIONS FOR THIS SECTION.

Form.

c. conical.
ob. obtuse.
r. roundish.

Number.	Names.	Descriptions.						Use and value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Brandywine	m	r ob c	b r	v g	July.	Am.	8	9	9
2	Crimson Beauty	m	r c	b c	v g	b July.	Kan.	8	7	8
3	Cuthbert	l	r c	b c	b	m July.	N. Y.	8	8	10
4	Golden Queen	l	r c	o	b	m July.	N. J.	8	8	9
5	Hansell	s	r	r	g	b July.	N. J.	7	7	7
6	King, *Early*	m	r c	b c	v g	b July.	Va.	8	7	8
7	Loudon	e	r c	b c	v g	m l July.	Wis.	8	8	10
8	Marlboro	l	r	r	g	b July.	N. Y.	7	7	9
9	Miller	l	r c	b c	v g	m July.	N. J.	8	7	8
10	Orange	l	c	o	b	July.	Penn.	10	10	4
11	Reder	l	r	b r	v g	m July.	Mich.	9	9	6
12	Reliance	m	r	b r	g	e July.	N. Y.	9	9	8
13	Turner	m	r	b r	v g	July.	Ill.	9	8	9

Of the red varieties King, Cuthbert and Loudon, will generally be found the most desirable. Turner is a productive and hardy sort, but is not firm enough for shipping. Golden Queen and Caroline may be

SECTION XVI.—STRAWBERRIES.

ABBREVIATIONS FOR THIS SECTION.

Form.

c. conical.
co. coxcombed.
i. irregular.
l. long.
n. necked.
o. oblong.
ov. oval or ovate.
r. roundish.

Color.

b. bright.
c crimson.
d. dark.
p. pale.
r. red.
s. scarlet.

Number.	Names.	Descriptions.								Use and value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Sex.	Texture.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Arrow	m	l c	d c	v g	p	m	13 June.	----------	8	7	8
2	Beder Wood	l	r c	c	g	b	m	12 "	Ill.	7	6	8
3	Brandywine	l	r c	d c	v g	b	m	14 "	Pa.	9	8	9
4	Brunette	l	r c	d c	v g	b	f	14 "	Ind.	10	8	8
5	Bubach No. 5	v l	ob r c	b c	v g	p	m	20 "	Ill.	8	8	10
6	Clyde	l	r c	l s	v g	b	m	13 "	Va.	8	6	9
7	Crescent	l	c	d s	g	p	s	12 "	Conn.	7	4	9
8	Cumberland	v l	r ob c	b c	v g	b	m	13 "	Penn.	9	8	8
9	Enhance	l	c co	d r	g	b	f	17 "	Ohio.	7	----	9
10	Enormous	v l	i r	d c	g	p	f	16 "	Ill.	8	7	8
11	Epping	m l	r d c	b s	g	p	f	16 "	N. H.	8	----	9
12	Eureka	v l	o c	b c	v g	p	m	17 "	Ohio.	8	----	8

SECTION XV.—RASPBERRIES.—RUBUS IDÆUS AND STRIGOSUS, INCREASING BY SUCKERS OR SPROUTS.

ABBREVIATIONS FOR THIS SECTION.

Color.

b. bright. c. crimosn. o. orange. p. purplish. r. red. s. scarlet.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore.	Northern lake shore.	
1	*?	*?	*?	*?	*?	Its beauty, size, color and firmness are strongly in its favor.
2	*?	*?	*?	*?	*?	Not self-fertile. Must be planted with other varieties.
3	**	**	**	**	**	Very firm, productive and hardy. Has come to be the leading market variety of its class.
4	*	*	*	*	*	Like Cuthbert, except in the color of the fruit
5	*	*	*	*	*	Hardy. Lacks vigor and productiveness.
6	*	*	*	*	*	A good early sort. Drops readily. For family use.
7	**	**	**	**	**	Plants hardy and productive. Fruit large, firm and of good quality.
8	*	*	*	*	*	Fairly vigorous and productive. Is being extensively planted.
9	*	*	*	*	*	Worthy of trial.
10	*?	*?	*?	*?	*?	Must have winter protection. Unequaled for amateur purposes; but very tender.
11	*?	*?	*?	*?	---	Esteemed by some growers. Canes not always healthy.
12	*?	*?	*?	*?	*?	Berries good, even size. Profitable, but its color is too dark.
13	*?	*?	*?	*?	*?	Very hardy, productive. Suckers profusely. Lacks firmness. Old but still valuable.

planted for home use. Of the black caps Palmer, Eureka, Conrath, Gregg and Kansas are among the best kinds either for home use or the market.

SECTION XVI.—STRAWBERRIES.

ABBREVIATIONS FOR THIS SECTION.

Sex of blossoms.	Texture.	Season.
b. bi-sexual or perfect.	f. firm.	The date (in June) of the ripening of the first perfect specimen is given in each case as the most convenient mode of indicating the relative season.
p. pistillate.	m. medium.	
	s. soft.	

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore.	Northern lake shore.	
1	*	*	*	*	*	Quite productive, of high quality and fairly firm.
2	*	*	*	*	*	Less grown than formerly.
3	*	*	*	*	*	Excellent as a family variety and for near-by markets.
4	*	*	*	*	*	Its high quality makes it desirable for home use.
5	**	**	**	**	**	One of the best varieties for market.
6	*	*	*	*	*	Rather light in color. A favorite for the local markets.
7	*	*	*	*	*	Vigorous plant. Very prolific, but lacks quality and firmness.
8	*	*	*	*	*	Excellent as a berry for home use, or for near marketing.
9	*	*	*	*	*	A large and productive late sort.
10	†	†	†	†	†	Large and productive; promising as a market sort.
11	*	*	*	*	*	Succeeds in some places.
12	*?	*?	*?	*?	*?	Bears profusely. A good late sort.

SECTION XVI.—STRAWBERRIES.—CONTINUED.

Number.	Names.	Descriptions.								Use and value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Sex.	Texture.	Season.	Origin.	Dessert.	Cooking.	Market.
13	Gandy	l	ob c	b c	v g	b	m	19 June.	N. J.	9	8	9
14	Glen Mary	v l	c	b s	v g	b	f	15 "	Pa.	8	8	9
15	Greenville	l	r c	b c	g	p	m	17 "	Ohio.	8	8	9
16	Haverland	l	o c	b c	v g	p	f	11 "	Ohio.	9	7	10
17	Jessie	v l	ob c	b c	v g	b	f	17 "	Wis.	9	7	7
18	Manchester	l	c r	c	g	p	f	26 "	N. J.	8	8	8
19	Marshall	v l	oc co	b g	g	b	m	18 "	Mass.	8	8	7
20	Mrs. Cleveland	l	....	b c	.. ...	p	.....	15 "	Ohio.	6	7	9
21	Parker Earle	m l	l c	c	v	b	f	16 "	Texas.	8	8	10
22	Ruby	l	r d c	b r	v g	b	f	15 "	Ill.	9	9	9
23	Saunders	l	c	c	v g	b	f	12 "	Ont.	7	8	9
24	Sharpless, *Ontario*	v l	o c co	b r	v g	b	m	14 "	Penn.	8	7	8
25	Warfield No. 2	m	c	d r	v g	p	f	12 "	Ill.	9	10	10
26	Wilson	l	r c	d c	g	b	f	11 "	N. Y.	6	9	9
27	Wm. Belt	v l	r c i	s	g	b	f	13 "	Ohio.	7	8	9
28	Woolverton	l	r c	c	g	b	f	13 "	Ont.	7	9	9

The strawberry list changes so frequently that what is given one year will seldom be of much value at the end of three or four years. Among the kinds best adapted for market are Warfield, Haverland, Bubach,

SUMMARY OF REJECTED VARIETIES.

LIST OF APPLES.

(The dates, 1893, etc., show the year the variety was dropped.)

Names.	Year.	Names.	Year.
American Beauty	1893	Early Long Stem	1888
American Pippin	1893	Evening Party	1890
Anglo American	1893	Flower *of Genesee*	1893
Aunt Hannah	1890	Fort Miami	1888
Autumn Pearmain	1879	Foundling	1893
Autumn Sweet Swaar	1893	Fourth of July	1893
Bars	1890	Gabriel *Ladies Blush*	1888
Beauty of Kent	1893	Garden *Comstock*	1893
Belle et Bonne	1893	Gilpin	1897
Bently Sweet	1893	Gloria Mundi	1897
Better than Good	1883	Green's Choice	1888
Blue Pearmain	1897	Green Newtown	1897
Bottle Greening	1893	Hall	1883
Burr Sweet	1893	Harvest Red Streak	1890
Bush	1879	Herefordshire	1893
Cabashea	1895	Hog Island Sweet	1893
Canada Remette	1895	Holland Pippin	1893
Chronical	1890	Hollow Crown	1893
Craig's August	1888	Horse	1893
Cumberland Spice	1893	Hosum's Red	1888
Daniel	1890	Hunt Russet	1893
Detroit Black	1893	Hulburt	1893
Detroit Red	1893	Indiana Favorite	1893
Drap d'or	1893	Jabez Sweet	1897

SECTION XVI.—STRAWBERRIES.—CONTINUED.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern lake shore.	Northern lake shore.	
13	*	*	*	*	*	Desirable late market berry. Good dessert fruit.
14	*	*	*	*	*	A large and attractive variety. Promising.
15	**	**	**	**	**	Valuable for local market or home use.
16	**	**	**	**	**	Plant vigorous. Proves valuable in many places. Stem weak. Very productive.
17	*?	*?	*?	*?	*?	Not generally productive.
18	*?	*	*?	*?	*	Has been a leading market berry; now little grown.
19	*	*	*	*	*	Highly praised by some. Requires strong land and good care. Color dark.
20	*	*	*	*	*	An Ohio seedling of fine promise.
21	**	**	**	**	**	Of good size and quality. Hardy. Very productive. Valuable if given high cultivation.
22	†	†	†	†	†	Handsome, firm and productive.
23	*	*	*	*	*	A promising market variety, originated by John Little of Ontario.
24	*	*	*	*	*	Not as much grown as formerly. Lacks firmness for distant marketing. Does best in hills.
25	**	**	**	**	**	A vigorous plant. Very productive. Best for market.
26	*	*	*	*	*	Colors early. Only good when fully ripe. Later pickings fail in size. Formerly the leading market berry with the mass of growers.
27	*	*	*	*	*	Valuable on strong soil.
28	*	*	*	*	*	An excellent variety for shipping.

Parker Earle, Greenville, Enhance and Gandy; while the Marshall does fairly well on strong rich soil, it is subject to the leaf blight and is too dark in color for long shipment.

SUMMARY OF REJECTED VARIETIES.—CONTINUED.

APPLES.—*Continued.*

Names.	Year.	Names.	Year.
Jefferson County	1893	Progress	1888
Jewett Best	1893	Pumpkin Russet	1888
Jewett Red	1893	Quarrenden	1893
Kaighn	1893	Rebecca	1893
Klaproth	1893	Richardson	1893
Lacker	1888	River	1888
Lancaster Greening	1879	Roman Stem	1897
Ledge Sweet	1893	Rose Red (Autumn Red)	1893
London	1893	Scarlet Pearmain	1893
Macomber	1893	Sine Qua Non	1893
Marston	1893	Slingerland	1893
May (Seek-no-further)	1893	Somerset (N. Y.)	1888
McAfee	1893	Spiced Sweet	1890
Melt-in-the-mouth	1888	Stillman	1893
Milan	1895	Striped Belleflower	1893
Newark Pippin	1888	Summer Hagloe	1897
Newtown Spitzenburg	1897	Summer Pippin	1893
Nick-a-jack	1893	Summer Rambo, *Rambour*	1895
Northern Sweet	1888	Summer Rambo (Mich.)	1893
Orange Pippin	1893	Summer Bellflower (N. Y.)	1888
Ortley (White Detroit)	1893	Summer Greening	1888
Pennock	1897	Summer Pound Royal	1897
Pittsburgh	1893	Sweet Baldwin	1888
Pound Royal (Winter)	1893	Sweet and Sour	1890

SUMMARY OF REJECTED VARIETIES.—Continued.

Names.	Year.
Apples.—*Continued.*	
Sweet Rambo	1893
Sweet Vandevere	1893
Sweet Winesap	1883
Table (Greening)	1888
Toole Indian	1893
Twin	1888
Walpole	1893
Washington Royal	1893
Water	1893
Wealthys Favorite	1888
Western Spy	1890
Wetherell Sweet	1893
White Doctor	1893
White Juneating	1890
White Spanish Reinette	1893
Winter Pippin (Mich.)	1893
Winter Paradise	1893
Winthrop Greening	1893
Apples—Crabs.	
Briers Sweet	1888
Byers	1893
Red Siberian	1893
Soulard	1893
Apricots.	
Hemskirk	1893
Red Masculine	1893
St. Ambroise	1893
Turkey	1893
Blackberries.	
Barnard	1893
Brunton	1890
Dorchester	1893
Wachusett	1893
White Seedling	1881
Dewberries.	
Bartle	1893
Mammoth	1893
Cherries.	
Arch Duke	1893
Buttner's Yellow	1888
Bauman May	1893
Belle D'Orleans	1893
Brant	1893
Burr	1893
Champagne	1893
China Bigarreau	1888
Delicate	1893
Doctor	1893
Donna Maria	1893
Downton	1893
Duchesse de Palluau	1885
Early Amber	1888
Jeffry	1893
Large White Bigarreau	1888
Logan	1893
Manning Mottled	1893
Merveille de Septembre	1888
Ohio	1893
Osceola	1893

Names.	Year.
Plumstone	1893
Pontiac	1893
Powhattan	1893
Red Heart	1888
Red Jacket	1893
Rivers Amber	1883
Rumsey's Late Morello	1885
Sparhawk	1893
Tradescant	1888
Transparent Guigne	1888
Tecumseh	1893
White French	1888
White Tartarian	1888
Wilkinson	1888
Currants.	
Anger's (Fertile de Anger)	1893
Hative	1893
Grapes.	
Allen	1888
Alvey	1888
Anna	1888
Belvidere	1888
Black Hawk	1888
Canada (Arnold's 16)	1893
Cornucopia (Arnold's 2)	1888
Creveling	1893
Croton	1888
Elvira	1893
Essex (Rogers' 41)	1893
Eumelan	1897
Gaertner	1893
Israella	1893
Kalamazoo	1893
Mottled	1888
Neff (Keuka)	1888
Norton's Virginia	1888
Othello (Arnold's 1st)	1888
Perkins	1893
Peter Wylie	1888
Rebecca	1888
Roger's 20	1888
Senasqua	1888
Taylor's Bullitt	1885
To Kalon	1888
Union Village	1888
York Madeira	1888
Walter	1893
Nectarines.	
Red Roman	1893
Stanwick	1893
Victoria	1893
Pears.	
Ananas d' Eté	1893
Brignais Des Nonnes	1893
Dix	1893
Dunmore	1879
Epine Dumas	1893
Gris D'Hiver Nouveau	1893
Goubalt	1890
Jalousie de Fontenay Vendee	1879
Kirtland	1893

SUMMARY OF REJECTED VARIETIES.—CONTINUED.

Names.	Year.
PEARS.—*Continued.*	
Langelier	1893
Le Conte	1893
Oswego	1893
St. Ghislain	1898
Washington	1893
Windsor	1893
PLUMS.	
Admiral	1879
Columbia	1893
Dorr's Favorite	1881
Imperial Blue	1893
Kirke	1893
Monroe	1893
QUINCES.	
Angers	1893
Portugal	1893
RED RASPBERRIES.	
Arnold's Red	1888
Bristol	1888
Clarke	1897
Delaware	1888
Early Andrews	1883
Fastolf (Naomi)	1888
Franconia	1893
Herstine	1895
Highland Hardy	1888
Hornet	1888
Kirtland	1888
Montclair	1888
Naomi	1895
Philadelphia	1895
Red Antwerp	1888
Saunders	1883
Superb	1893
Thwack	1888
Winant	1883
BLACK CAP.	
American White	1893
Beebe	1893
Canada	1888
Carman	1897
Cromwell	1897
Davison's Thornless	1888
Ellisdale	1888
Florence	1893
Ganargua	1885
Golden Thornless	1893
Hopkins	......
Lum's Everbearing	1883
Miami	1893
New Rochelle	1893
Norwood	1888
Older	......
Ontario	1893
Purple Cane	1888
Seneca	1888
Weatherbee	1888
PEACHES.	
Atlanta	1893
Beatrice	1893
Bergen	1893
Briggs May	1893
Cole	1893
Columbia	1893
Coopers Mammoth	1883
Delavan	1893
Downing	1893
Early Admirable	1893
Early York	1893
Haines	1893
Imperial	1893
Keyport	1897
Lady Palmerston	1897
Large White Cling	1893
Late Admirable	1893
Late Red Rareripe	1893
Macon (Local)	1893
Muscogee	1888
Nonpareil	1893
Oblong	1893
President	1893
Pullen	1893
Reeves Late	1893
Ruding Late	1893
Silver Medal	1893
Snow	1893
Temple Late	1893
Thurber	1888
Tippecanoe	1893
Troth	1897
Van Zandt	1893
Variegated	1893
Windoes	1881
Wheeler Early	1893
STRAWBERRIES	
Afrique	1883
Agriculturalist	1888
Alpha	1897
America	1883
Arnold's Pride	1893
Atlantic	1893
Belmont	1895
Bidwell	1897
Black Defiance	1893
Boston Pine	1885
Boyden (Seth Boyden)	1893
Bright Ida	1893
Burgess	1885
Burr Oak	1883
Burr's New Pine	1888
Captain Jack	1895
Caroline	1883
Centennial Favorite	1883
Champion	1893
Chas. Downing	1895
Cheney	1893
Cinderella	1883
Cornelia	1890
Cowing	1893
Crimson Cluster	1893
Crimson Cone	1883
Damask Beauty	1883
Daniel Boone	1890
Dr. Warder	1883
Downer	1893
Duchess	1888
Duncan	1893

SUMMARY OF REJECTED VARIETIES.—CONCLUDED.

STRAWBERRIES.—*Continued.*

Names.	Year.
Early Canada	1893
Early Hudson	1883
Emperor	1883
Essex Beauty	1883
Excelsior	1885
Fillmore	1883
Forest Rose	1885
Fowler's Seedling	1883
French	1883
Frontenac	1883
Gem, *Nehring*	1897
Gen. Sherman	1883
Gipsey	1890
Glendale	1893
Golden Defiance	1885
Goldsmith	1890
Grace	1883
Great American	1888
Green Prolific	1888
Hervey Davis	1888
Henderson	1893
Hooker	1885
Hudson No. 10	1883
Hovey	1888
Ida	1883
Indiana	1893
Iowa Prolific	1883
Jersey Queen	1897
Jewell	1893
Jucunda	1893
Kentucky	1895
Kirkwood	1885
Kissany	1883
Large Ey. Scarlet	1883
Lennig's White	1883
Longfellow	1890
Longworth's prolific	1883
Luckhurst	1883
Maggie	1893
Major McMahon	1883
Marvin	1885
Matilda	1885
May King	1893
Metcalf	1885
Miami	1893
Michigan	1885
Miner	1897
Minnesota	1885
Monarch of the West	1888
Mt. Vernon	1897
Napoleon III	1883
New Dominion	1893
New Jersey Scarlet	1888
Nicanor	1890
Ohio	1893
Pearl	1897
Phelps (Old Iron Clad)	1893
Photo (Martha)	1888
Pioneer	1888
Pres. Lincoln	1883
Pres. Wilder	1883
Romeyn	1883
Russell	1885
Russell's Advance	1890
Scarlet Globe	1883
Seedling Eliza	1883
Seneca Chief	1885
Seneca Queen	1893
Shuckless	1897
Springdale	1885
Shirts	1890
Star of the West	1883
Star	1883
Sterling	1883
Sucker State	1883
Summit	1893
Timbrell	1897
Triomphe *de Gand*	1897
Victoria (Golden Queen)	1887
Vick	1890
Warren	1898
Walden	1883
Wilding Seedling	1883
Windsor Chief	1881
Woodruff	1883

CONSTITUTION AND BY-LAWS.

ARTICLE I.—NAME, TERRITORY AND OBJECTS.

The name of the society shall be the Michigan State Horticultural Society, and its territory shall be the state of Michigan. Its objects shall be the development of an adequate appreciation of the peculiar adaptation of the soils and climate of the state to the pursuit of horticulture in all its branches; and the collection and dissemination of information bearing upon the theory and practice of the same, as well as upon the arts and sciences directly or indirectly associated therewith, or calculated to elevate or improve the practice thereof.

ARTICLE II.—OFFICERS AND MODE OF ELECTION.

The officers of the society shall be a president, a secretary and a treasurer, together with an executive board of six members, aside from the president, secretary and treasurer, who shall be *ex officio* members of the said board.

Said board shall designate one of its members as vice-president. The officers shall be elected by ballot.

The society may, at its discretion, elect an honorary president, whose term of office shall be for life, said office to be an honorary one, without duties, and established to express the sense of obligations which the society may feel to one of its members who may unselfishly give a lifetime of earnest effort to promote its interests, to further the horticultural interests of this State.

ARTICLE III.—A QUORUM.

Four members of the executive board shall constitute a quorum for the transaction of business at any meeting of said board: *Provided*, That each of the members thereof shall have been notified, in the usual manner, of the time, place, and object of such meeting.

ARTICLE IV.—ANNUAL MEETING AND ELECTION OF OFFICERS.

The annual meeting of the society, for the election of officers specified in Article II, shall occur upon the first Wednesday of December in each year.

ARTICLE V.—TERMS OF OFFICE.

The officers specified in Article shall hold their offices until the thirty-first day of December of the year for which they were elected, and thereafter until their successors shall have been elected, and shall have signified to the secretary their acceptance: *Provided*, That the terms of office of the six members of the executive board shall be so arranged that but two regular vacancies shall occur in each year.

ARTICLE VI.—ANNUAL AND LIFE MEMBERS.

Any person may become a member of the society for one year by paying to the treasurer the sum of one dollar; and the yearly term of all annual memberships shall expire on the thirty-first day of December of the year for which they were taken, but be regarded as continuous, except as may be provided by the by-laws. Any person may become a life member by the payment at any one time of the sum of ten dollars into the treasury of the society.

ARTICLE VII.—AMOUNT OR LIMIT OF PROPERTY.

The society may hold real and personal estate to an amount not exceeding twenty thousand dollars.

ARTICLE VIII.—BY-LAWS.

By-laws for the government of the society shall be framed, and when needful, amended by the executive board; but changes thereof may be at any time proposed by the society in general meeting.

ARTICLE IX.—AMENDMENTS.

This constitution may be amended at any regular meeting of the society, by a vote, by ballot, of two-thirds of all the members present and voting: *Provided*, That notice of such proposed amendment, specifying its purport, shall have been given at the last previous regular meeting.

BY-LAWS OF THE MICHIGAN STATE HORTICULTURAL SOCIETY.

I.—THE PRESIDENT.

1st. The president shall be the executive officer of the society, and of the executive board; and it shall be his duty to see that the rules and regulations of the society, and of the executive board, are duly enforced and obeyed.

2d. He may, in his discretion, and in the lack of needful rules, during the recesses of the society and of the board, prescribe rules for the management of the interests or business of the society, such rules to continue in force till the next session of the executive board, and until, by its action, they shall have become no longer necessary.

3d. He shall act in conjunction with the secretary in the preparation of programmes or order of business, for the sessions of the society; and in the devising of plans and processes for the maintenance of its interests.

4th. He shall have the best interests of the society at heart, and shall lead in forwarding any and all enterprises calculated to add to its permanency or to increase its usefulness, and establish it more firmly in the public confidence.

II.—VICE PRESIDENT.

The vice-president shall perform the duties of the president in case of the absence or inability of that officer; and may be called upon by the president to assume the duties of the chair at any meeting of the society or executive board.

III.—THE SECRETARY.

1st. The secretary shall be the recording, corresponding, and accounting officer of the society, and he shall also be, jointly with the business committee, its financial and auditing officer.

2d. He shall incur no expenditure of a large or doubtful character except with the sanction of the executive board or of the business committee.

3d. He shall submit all bills or claims against the society to the business committee for approval, and indorsement to that effect, before drawing his order upon the treasurer for payment of the same.

4th. He shall attend all meetings of the society, and of the executive board, and shall keep a faithful record of their proceedings.

5th. He shall sign all certificates of membership, and all diplomas and certificates of merit awarded by the society.

6th. He shall have charge of the society's books and papers, excepting only such as, by the advice or discretion of the executive board, shall be placed in charge of the librarian, and he shall be responsible to the board for the safe keeping of the property placed in his charge.

7th. He shall be the custodian of the seal of the society, and shall have authority to affix the same to documents when needful.

8th. He shall seek by all suitable means to secure the fullest announcement of the meetings of the society in this state, as well as in adjacent states, when such shall be found desirable.

9th. He shall, so far as practicable, cause the transactions of the society, together with such valuable or interesting papers as shall be read at its sessions, to be properly published, and thus placed within reach of the state.

10th. It shall also be his duty, yearly, to prepare for publication the annual report of the society, together with such other matter as he shall deem proper—he being aided in the selection of such matter by an advisory committee of the executive board.

IV.—THE TREASURER.

1st. All the funds of the society shall be paid into the hands of the treasurer.

2d. He shall disburse the moneys of the society that shall come into his hands only upon the order of the secretary, countersigned by the president.

3d. He shall keep the moneys received by the society for life memberships as a distinct fund, and shall invest the same under the advice and direction of the executive board, applying only the interest accruing thereon to the purposes of the general fund.

4th. Immediately upon assuming his office, and before entering upon its duties, he shall execute to the society an official bond with sufficient sureties, conditioned for the safe keeping and disbursement of the moneys of the society, and for the proper discharge of the further duties of his office, in such sum as shall be specified by the executive board. Such bond shall receive the approval of the president and shall be deposited with the secretary.

5th. He shall, at the close of each year, report to the executive board the amount of money that shall have come into his hands during the year, the sources from which it has been derived, and the disposition made of the same.

V.—THE LIBRARIAN.

1st. The librarian shall have the custody of the library of the society. He shall be appointed by the executive board, and may be displaced at its pleasure.

2d. He shall act jointly with the secretary in the care and arrangement of the same, and in the reception, custody, and disposal of the volumes of the transactions annually supplied to the society by the state.

3d. He shall have the custody of the rooms assigned to the society at the state capitol, together with such books and other property as the society or the board shall direct to be deposited therein.

4th. He shall report annually, at the close of the year, to the executive board the amount and condition of the property in his hands.

VI.—THE EXECUTIVE BOARD.

1st. The executive board shall enact the rules and regulations for the management of the affairs of the society, determine the salaries of its officers, and assume the control and management of its exhibitions.

2d. It shall have power to displace any officer of the society for neglect of duty or abuse of position, and to fill all vacancies by appointment, to continue till the next annual election.

3d. The board shall hold four regular sessions during the year, to occur at the times and places for the regular meetings of the society.

4th. Other meetings may be called by the secretary under the advice or direction of the president, or of a majority of its members, at such times and places as may be deemed most convenient; but in all such cases each member must be notified of the time, place, and object of such meeting.

5th. It shall be the duty of the board to carefully guard the general interests of the society, to watch over its finances, and to provide for its necessities as they shall arise.

6th. All important measures shall be submitted to this board, but they may by the board be re-submitted to the society for recommendations.

7th. The board shall, at the annual meeting, submit through the secretary, in connection with the reports of officers, such further report upon the condition, interests, and prospects of the society as it shall judge necessary or expedient.

8th. Two members of the executive board are to be elected each year, to hold the office for three years, but if any member shall absent himself from two or more consecutive meetings of the society and of the board, without reason satisfactory to the board, the said board may, in its discretion, consider the office vacant, and proceed to fill such vacancy by appointment, to continue to the next annual election.

VII.—THE BUSINESS COMMITTEE.

1st. It shall be the duty of the executive board, annually, upon entering upon the duties of the new year, to appoint from their own number three members who shall constitute a business committee for the year.

2d. All accounts or claims against the society, when presented to the secretary for payment, shall, before payment, receive the sanction and indorsement of the business committee.

3d. Such claims shall be submitted to this committee and approved in duplicate, one copy to remain with the secretary as his warrant for the payment of the same, and the other to be transmitted by him to the president, along with his order upon the treasurer, as his warrant for countersigning the same.

4th. It shall be the duty of the business committee, upon application of the secretary, during the recess of the executive board, to advise with him as to the expediency of making any contemplated but questionable expenditure for which occasion may arise during such recess.

VIII.—STANDING COMMITTEE.

1st. There shall be a standing committee on revision of the catalogue, to be composed of one member from each of the five districts into which the state is for this purpose divided, with one member chosen from the state at large, who shall be the chairman of the committee.

2d. Each member of said committee (except the chairman) is empowered and expected to choose a sub-committee for his district, of which he shall be chairman.

3d. It shall be the duty of each sub-committee to collect and report, each year, to the general chairman, such facts respecting fruit culture in the district as shall promise to be of value in the revision of the catalogue.

4th. There shall be a standing committee on new fruits, to consist of a chairman, with as many associates as such chairman shall find it desirable to appoint.

5th. Such other standing committees may from time to time be appointed by the executive board as, in its discretion, it shall deem desirable or necessary.

6th. All standing committees are expected to report at the annual meeting in December, any information of value to the society or its members that may have come to their knowledge during the year, as well as any scientific theories, deductions, or facts that, in their opinion, may be useful in advancing the objects for which the society is laboring.

IX.—LIFE MEMBERSHIP FUND.

1st. All moneys coming into the treasury of the society in payment for life memberships shall constitute a perpetual fund, to be known as the life membership fund.

2d. The principal of this fund shall be invested by the treasurer under the advice and direction of the executive board.

3d. All interest accruing upon any portion of said fund shall constitute and become a part of the fund of the society devoted to the payment of its ordinary expenses.

X.—MEETINGS OF THE SOCIETIES.

1st. The society shall hold its first regular meeting for the year during the month of January or February for the inauguration of the officers chosen at the annual meeting held the previous December, as provided in article IV of the constitution, and also to arrange its plan of operations for the year.

2d. Its second regular meeting shall be held in the month of June at such date as shall best accommodate an exhibit of the early summer fruits.

3d. Its third regular meeting shall be at its annual exhibit of autumn and winter fruits, in the month of September or October.

4th. Its fourth regular meeting shall occur in connection with its annual election of officers, in December, as provided in article IV of the constitution.

5th. The times and places for the occurrence of these regular meetings (excepting only the *time* of the annual meeting), shall be determined by the executive board.

6th. Other meetings may be called by the secretary, under the advice or direction of the members of the executive board, at times and places by them deemed expedient.

7th. In case of the calling of a special meeting for the election of officers of the society, in consequence of any failure to elect at the annual meeting, as provided in section IV of the constitution, all persons entitled as members to vote at such annual meeting shall be considered as retaining such membership for such purpose until such election, and until such officers so elected shall have been inducted into office.

XI.—RULES FOR DISCUSSIONS, ETC.

1st. The deliberations and discussions of the society shall be conducted in accordance with ordinary parliamentary usages.

XII.—AUXILIARY SOCIETIES.

1st. The society shall, in all reasonable and proper ways, encourage the formation of local horticultural or pomological societies auxiliary to the society in all such counties or other municipalities of this state, as shall afford a reasonable prospect that they will be able to effectually maintain the same.

2d. It shall be the policy of this society in supervising the organization of such local societies to secure an identity of constitutional provisions throughout, and in so doing to insure harmony among them; but at the same time it will not discourage the including by them of special or local objects in cases in which such shall be found desirable, so long as the introduction of the requisite provisions therefor into the constitution and by-laws of the auxiliary society shall not be deemed likely to interfere with the harmonious workings of the whole.

3d. Any person who shall become a member of an auxiliary society for one year, and comply with its regulations as to fee, shall thereby become an auxiliary member of this society also for the same time, and entitled to all the rights and benefits of full membership, except that he or she shall not have the right to vote at the annual election of officers or upon questions of the expenditure of money.

4th. On receipt by the secretary, from the secretary of such auxiliary society, of a list of officers and members of that society, he shall file the same; and upon issuance of the Annual Report shall supply such auxiliary society with a sufficient number of volumes to provide one for each of its members. He shall also transmit the names of such officers and members, with their postoffice addresses, to the secretary of any and all experiment stations and societies willing to supply bulletins and reports and to the national department of agriculture for the same purpose; and the secretary shall issue to such auxiliary society a certificate of membership for the year.

5th. Reports of auxiliary societies shall be made to the secretary of this society on or before the fifteenth day of January of each year, and shall include the officers for the ensuing year and a statement of the proceedings of such society during the past year, which shall be incorporated into the Annual Report of the preceding year.

XIII.—AMENDMENTS, ADDITIONS, SUSPENSIONS.

1st. Amendments or additions to these by-laws may be made by a majority vote of the executive board, at any meeting; but if objections shall be made the same shall "lie upon the table" till the next regular meeting of the board.

2d. These by-laws, or any one or more of them, may be suspended for the time, by order of a majority of all the members of the society present and voting.

3d. A proposition in the general meeting of the society for the amendment or addition to these by-laws shall be referred to the executive board for consideration and decision; but the society may submit therewith its advice or request.

LAWS OF MICHIGAN RELATING TO HORTICULTURE.

YELLOWS AND BLACK KNOT.

AN ACT to prevent the spread of the contagious disease known as yellows, black knot, peach rosette, and pear blight among peach, plum, cherry, prune, almond, apricot, nectarine, and pear trees, or the fruit thereof, by providing measures for the eradication of the same, and to repeal act number one hundred twelve of the public acts of eighteen hundred ninety-three, approved May twenty-fifth, eighteen hundred ninety-three.

[Act 109 Laws 1895.]

SECTION 1. *The People of the State of Michigan enact,* That it shall be unlawful for any person to keep any peach, almond, apricot, plum, prune, cherry, nectarine or pear tree infected with the contagious diseases known as yellows, black knot, peach rosette or pear blight, or to offer for sale or shipment or to sell, or to ship any of the fruit thereof, except the fruit of the plum, cherry and pear tree; that both tree and fruit so infected shall be subject to destruction as public nuisances as hereinafter provided. No damages shall be awarded in any court in the State for entering upon the premises and destroying such diseased trees, or parts of trees, or fruit, if done in accordance with the provisions of this act. It shall be the duty of every person as soon as he becomes aware of the existence of such disease in any tree, parts of trees, or fruit owned by him, to forthwith destroy, or cause said trees or fruit to be destroyed.

SEC. 2. In any township or city in this State in which such contagious diseases exist, or in which there is good reason to believe they exist, or danger may be justly apprehended of their introduction, it shall be the duty of the township board or city council, as soon as such information bcomes known to either such board or council, or any member thereof, to appoint forthwith three competent freeholders of said township or city, as commissioners, to be known as yellows commissioners, who shall hold office during the pleasure of said board, or city council, and such order of appointment and of revocation shall be entered at large upon the township or city records: *Provided,* That the commissioners now appointed and in office shall continue in said office until their successors are appointed and qualified: *Provided,* That in case commissioners have already been appointed to prevent the spreading of bush, vine and fruit tree pests, such commissioners shall be *ex officio* commissioners under this act.

SEC. 3. It shall be the duty of said commissioners, within ten days after appointment as aforesaid, to file their acceptances of the same with the clerk of said township, or city, and said clerk be *ex officio* clerk of said board of commissioners and he shall keep a correct record of the proceedings of said board in a book to be provided for the purpose, and shall file and preserve all papers pertaining to the duties and actions of said commissioners, or either of them, which shall be a part of the records of said township or city.

SEC. 4. It shall be the duty of the commissioners, or any one of them, upon, or without complaint, whenever it comes to their notice that either of the diseases known as yellows, black knot, peach rosette or peach blight exists, or are supposed to exist within the limits of their township, village or city, to proceed without delay to examine the tree or fruit supposed to be infected, and if the disease is found to exist, a distinguishing mark shall be placed upon the diseased trees, and the owners notified personally, or by written notice left at his usual place of residence, or if the owner be a non-resident, by leaving the notice with the person in charge of the trees or fruit, or the person in whose possession said trees or fruit may be. The notice shall contain a simple statement of the facts as found to exist, with an order to effectually uproot and destroy, by fire, or as the commissioner shall order, the trees so marked and designated, or such parts thereof, within five days, Sundays excepted, from the date of the service of the notice, and in case of fruit so infected, such notice shall require the person in whose possession or control it is found to immediately destroy the same, or cause it to be done, or the commissioner may destroy the same. Said notice and order to be signed by one or more of the commissioners.

Sec. 5. In case any person who is interested in any tree or trees so ordered to be destroyed shall feel aggrieved by such order and shall believe that such trees are not so diseased, he may serve a written notice upon all of the commissioners in the township in which such trees are situated, which notice shall specify the part of such order to which objection is made and the particular tree or trees included in such order which it is claimed are not so diseased and shall request an examination of such tree or trees by all of said commissioners, which notice shall be served personally upon each of said commissioners within the five days given for the destruction of said trees, and it shall thereupon be the duty of all of said commissioners who have not already done so to personally examine such tree or trees as soon as practicable, and within said five days, and if a majority of all the commissioners shall agree that such tree or trees are so diseased, they shall order the same to be destroyed forthwith by the owner or custodian thereof, but if a majority shall decide that such tree or trees, or any of them, are not so diseased, they shall revoke the order of the commissioner to destroy the same so far as it relates to the trees so found to be free from disease, but this section shall not apply to fruit ordered to be destroyed.

Sec. 6. Whenever and person shall refuse or neglect to comply with the order to remove and destroy the trees or parts of trees so designated and marked by the commissioner as aforesaid, it shall become the duty of the commissioner to cause said trees or parts of trees to be removed and destroyed forthwith, employing all necessary aid for that purpose. The expenses for such removal and destruction of trees or parts of trees to be a charge against the township or city, and for the purpose of such removal [and] on destruction, the said commissioners, their agents and workmen, shall have the right and power to enter upon any and all premises within their township or city.

Sec. 7. If any owner neglects to uproot and destroy or cause to be removed and destroyed as aforesaid, such diseased trees, or parts of trees, or fruit, after such examination and notification, and within the time hereinbefore specified, or any other person who shall sell or offer for sale such diseased fruit, such person shall be deemed guilty of a misdemeanor, and punished by a fine not exceeding one hundred dollars or by imprisonment in the county jail not exceeding three months, or both, in the discretion of the court, and any justice of the peace of the township or city where such trees may be, or where such nursery stock or fruit is sold, shipped, disposed of, or delivered as aforesaid, shall have jurisdiction thereof. The words "parts of treees," wherever used in this act, shall refer to black knot and pear blight only, and not trees affected with yellows.

Am. P. A. 1897, act 110. Sec. 8. The commissioners shall be allowed for services under this act, two dollars for each full day, and one dollar for each half day, and their other charges and disbursements hereunder, to be audited as well as any other charges and disbursements under this act, by the township board or city council, all of which costs, charges, expenses and disbursements, shall be certified by the commissioners to the supervisors or city council on the first day of October of each year. Said certificate shall describe the lands on which such diseased trees stood, and the expense incurred in removing the same. The amount so certified shall be levied by the supervisor upon the premises described in said certificate, the owners or occupants of which having refused to remove and destroy said diseased trees as required in this act. The amount so levied shall be collected in the same manner as delinquent highway taxes are collected, and shall be paid into and belong to the general fund of the township or city as the case may be.

Sec. 9. All of act number one hundred and twelve of the public acts of eighteen hundred and ninety-three be and the same is hereby repealed.

SPRAYING.

AN ACT to amend act number one hundred eight, session laws of eighteen hundred ninety-five, entitled "An act to prevent the spreading of bush, vine and fruit tree pests, such as canker worm and other insects, and fungus and contagious diseases, and to provide for their extirpation."

[Act 2, Laws 1897.]

SECTION 1. *The People of the State of Michigan enact,* That act number one hundred eight of the public acts of eighteen hundred ninety-five, entitled "An act to prevent the spreading of bush, vine and fruit tree pests, such as canker worm and other insects, and fungus and contagious diseases, and to provide for their extirpation," be and the same is hereby amended so as to read as follows:

SECTION 1. *The People of the State of Michigan enact,* That it shall be the duty of every owner, possessor, or occupier of an orchard, nursery or vineyard, or of land where fruit trees or vines are grown, within this State, to spray with poisonous solution or disinfectant and of sufficient strength to destroy such injurious insects or contagious disease, all fruit trees or vines grown on such lands which may be infested with any injurious insect or worm, or infected with any contagious disease known to be injurious to fruit or fruit trees or vines: *Provided,* That if such trees and vines are infested with the San Jose or other scale insects, such trees or vines shall be either effectually sprayed or destroyed: *Provided, also,* That no such spraying shall be done while said fruit trees or vines are in blossom, except in case of canker worm.

SEC. 2. In any township in this State where such injurious insects or contagious diseases are known to exist or in which there is good reason to believe they exist, or danger may be justly apprehended of their introduction, it shall be the duty of the township board, upon the petition of at least ten freeholders of such township, to appoint forthwith three competent freeholders of said township as commissioners, who shall hold office during the pleasure of the board, and such order of appointment and of revocation shall be entered at large upon the township record: *Provided,* That in townships having a board of yellows commissioners, such commissioners shall be *ex officio* commissioners under this act.

SEC. 3. It shall be the duty of said commissioners within ten days after appointment as aforesaid, to file their acceptance of the same with the clerk of said township, and said clerk shall be *ex officio* clerk of said board of commissioners, and he shall keep a correct record of the proceedings of said board in a book to be provided for that purpose, and shall file and preserve all papers pertaining to the duties and actions of said commissioners, or either of them, which shall be a part of the records of said township.

SEC. 4. It shall be the duty of said commissioners or any one of them, upon, or without complaint, whenever it comes to their notice, that any orchard, fruit trees or vines are infested with canker worm or other injurious insects or contagious disease, within their townships, to proceed without delay to examine such orchards or vineyards, supposed to be infested, and if such injurious insects or contagious diseases are found to exist, the owner shall be notified personally, or by a written notice left at his usual place of residence, or if the owner be a non-resident, by leaving the notice with the person in charge of the trees or vines, or the occupant of the lands upon which such trees or vines shall be growing. The notice shall contain a simple statement of the facts as found to exist with an order to effectualy destroy such injurious insects or worms or contagious disease by spraying such trees or vines with a poisonous solution, or in case of contagious disease to effectually disinfect said diseased trees or vines, or in case of San José or other scale insect to effectually spray or destroy such infested trees, within such time from the date of the service of the notice as such commissioners, shall designate, said notice and order to be signed by the full board of commissioners.

SEC. 5. Whenever any person shall refuse or neglect to comply with the order to spray or disinfect the orchards or vineyards designated by the commissioners, as aforesaid, or in case of San José or other scale insects to effectually spray or destroy such infested trees, it shall become the duty of the commissioners to cause said trees or vines to be effectually sprayed with a poisonous solution or disinfectant as occasion should require, or in case of San José or other scale insect to effectually spray or destroy such infested trees forthwith, employing all necessary aid for that purpose, and the expenses for the same shall be a charge against the township, and for said spraying, disinfecting or destroying, the said commissioners, their agents or workmen, shall have the right and power to enter upon any and all premises within their township.

Sec. 6. If any owner, township officer, or commissioner, neglects or refuses to comply with the requirements of this law as set forth in the preceding sections and within the time therein specified, such person shall be deemed guilty of a misdemeanor and punished by a fine not exceeding fifty dollars or imprisoned in the county jail not exceeding sixty days, or by both such fine and imprisonment in the discretion of the court, and any justice of the peace of the township where such trees or vines may be growing shall have jurisdiction thereof.

Sec. 7. The several commissioners shall be allowed for service under this act two dollars for each full day, and one dollar for each half day, and their other charges and disbursements hereunder to be audited as well as any other charges and disbursements under this act by the township board, all of which costs, charges, expense and disbursements shall be recovered by the township from the owner of said infected or infested orchards or vineyards, or from the owner of the premises on which said trees or vines may be growing, in an action of assumpsit. The provisions of this act shall not apply to the contagious disease known as yellows.

NURSERY INSPECTION—SAN JOSÉ SCALE.

AN ACT to prevent the introduction or spread of San José scale or other inujrious insects or infectious diseases of trees, vines, shrubs or plants grown in this State or imported from other states, provinces or countries.

[Act 137, Laws 1897.]

Section 1. *The People of the State of Michigan enact*, That it shall be the duty of the State Board of Agriculture, immediately upon the taking effect of this act, to appoint some competent person who shall be known as State inspector of nurseries and orchards, who shall hold office during the pleasure of said board, whose duty shall be to inspect any and all nurseries in the State of Michigan, as to whether they are infected by San José scale or other injurious or destructive insects or infected with infectious or contagious diseases, and if upon such inspection he find no such dangerous insects or diseases, he shall upon payment of per diem fee hereinafter provided, give to the owner of such nurseries a certificate to that effect, and shall file a duplicate certificate with the State Board of Agriculture; and in case he shall find present in any such nursery any of said dangerous insects or diseases, he shall notify the owner thereof in writing, and shall direct him within five days to use such means as will exterminate such dangerous diseases or insects, and the owner of such nursery shall not ship nor deliver any such trees, vines, shrubs or plants affected by such dangerous insects or diseases until he shall have secured from said inspector a certificate as aforesaid.

Sec. 2. The owner of such nursery, trees, vines, shrubs or plants shall, within the time specified in such notice, take such steps for the destruction of such insects or diseases as will exterminate the same, and he shall not ship nor deliver any such trees, vines, shrubs nor plants affected with such dangerous diseases or insects under the penalty of a fine of one dollar for every tree, vine, plant or shrub so affected, when shipped or delivered from such nursery, which fine shall be collected by suit by the prosecuting attorney of the county in which said nursery is located.

Sec. 3. Whenever it shall happen that the State inspector of nurseries and orchards shall give the notice heretofore required to the owner of a nursery, for the destruction of the insects or diseases mentiond, and said owner shall fail or neglect to take the measures necessary for the destruction thereof, within the time mentioned in the notice given him, it shall be the duty of the State inspector of nurseries and orchards to have the proper remedies applied to such nursery for the destruction of such diseases or insects, and shall employ all necessary assistance and may enter the premises of said owner of such nursery for the purpose of treating and exterminating such insects or diseases, and the said owner of such nursery shall be liable for the costs of such proceeding, for the services of the inspector at a rate per diem to be fixed by the State Board of Agriculture, not to exceed three dollars per day, and for such number of days as said board shall determine, which said charge must be paid before delivery of the certificate in section one of this act.

Sec. 4. Whenever any trees, shrubs, plants or vines are shipped into this State from another state, country or province, every package thereof shall be plainly labeled on the outside with the name of the consignor, the name of the consignee, th contents, and a certificate showing that the contents have been inspected by a state or government officer, and that the trees, vines, shrubs or plants therein contained appear free from all injurious insects or diseases. Whenever any trees, shrubs, vines or plants are shipped into this State without such certificate plainly fixed on the outside of the package, box or car containing the same, the fact must be reported within twenty-four hours to the State Board of Agriculture by the railway, express or steamboat company, or other person or persons carrying the same; and any agent of any railway, steamboat or express company, or any other person or persons who shall violate the provisions of this section shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than twenty-five nor more than one hundred dollars, or imprisonment in the county jail not less than five nor more than thirty days, or may be so fined and imprisoned in the discretion of the court, and any such fine shall be paid to the State Board of Agriculture.

Sec. 5. Any person or persons growing or offering for sale in this State any trees, vines, shrubs or plants commonly known as nursery stock, shall, on or before the first day of August in each year, apply to the State Board of Agriculture, for inspection of said stock under the provisions of this act and a license for its sale, and shall deposit with said board a fee of five dollars as a license fee for himself as principal. Such license shall be good for one year and shall not be transferable, and each of such persons, principals, shall execute to the State Board of Agriculture, a bond in the sum of one thousand dollars, with good and sufficient sureties satisfactory to said board, conditioned that he will comply with all the provisions of this act ,and that upon demand he will file with the State Board of Agriculture, a list of persons to whom he has sold or delivered any such nursery stock, giving the species, together with the postoffice adress of each purchaser, which list shall be held in strict confidence by the said State Board of Agriculture, and not be subject to inspection by the public. Failure on the part of any nurseryman, grower, agent or dealer to comply with the provisions of this section shall render him or them liable to the penalties of a fine of not more than one hundred nor less than twenty-five dollars, or imprisonment in the county jail for not more than ninety nor less than thirty days, or both such fine and imprisonment in the discretion of the court, for each and every such sale. Such information shall be preserved and be for the sole use of the nursery and orchard inspector and his deputies: *Provided*, That the provisions of the preceding section shall not apply to persons engaged in fruit growing, who are not nurserymen, who desire to sell or exchange surplus trees or plants of their own growing.

Sec. 6. No person, firm or corporation, resident of another state, province or country shall engage or continue in the business of importing any trees, plants, shrubs or vines, commonly known as nursery stock, into this State, or of selling such importations within the State, or of selling such articles within the State, for subsequent importation into it, without first having obtained from the State Board of Agriculture a license to do business in this State as provided in section five of this act, and shall have filed with the State Board of Agriculture the bond therein required, together with a certificate of inspection by a state or government inspector or that of some person designated by the Michigan State Board of Agriculture for such purpose.

Sec. 7. The State Board of Agriculture shall, upon receipt of the fee referred to in this act, together with the required bond and a satisfactory certificate of inspection, issue licenses to the applicant according to the provisions of this act.

Sec. 8. Whenever the commissioners under acts number one hundred and eight and one hundred and nine, session laws of eighteen hundred and ninety-five, known as yellows commissioners, shall be uncertain as to the existence or nature of any infectious or contagious disease or dangerous insect pest in an orchard or elsewhere, or in case any dispute shall arise between owners and commissioners, it shall be the duty of said commissioners to notify the State inspector of orchards and nurseries, who shall at once investigate or inquire into the matter and suggest or recommend the proper remedies, and give all the information he can to aid in exterminating such insects or diseases, and his decision of the case and recommendation shall be final.

Sec. 9. It shall be the duty of the State inspector, whenever it shall come to his knowledge that any destructive insects or infectious or contagious diseases exist in any orchard in this State, or are supposed to exist, to investigate the case, and if such dangerous insects or diseases are found, he shall have authority to enter upon the premises and proceed according to the provisions of sections one, two and three of this act, in exterminating the same. In case the owner or occupant of the premises shall refuse or neglect to comply with the orders of said inspector within five days, the inspector shall employ such aid as may be necessary to carry out his orders and recommendations, the expense of which procedure shall be certified to the township board and by them allowed, who shall cause the same to be assessed as a special tax upon the premises concerned.

Sec. 10. The State inspector of orchards and nurseries shall have power to appoint such number of deputy inspectors as may be required, subject to approval by the State Board of Agriculture.

Sec. 11. All expenses incurred under the provisions of this act, not otherwise provided for, shall be audited by the State Board of Agriculture, and paid out of the general fund of the State, and the Auditor General shall draw his warrant for the same: *Provided*, That all moneys collected by the State Board of Agriculture, under this act, shall be paid into the general fund of the State Treasury.

PILFERING FROM ORCHARDS.

AN ACT to protect vineyards, orchards, and gardens, and to repeal act number 131, public acts of 1869, entitled "An act to protect vineyards in the State of Michigan," being section 9195 of Howell's annotated statutes.

Section 1. *The People of the State of Michigan enact,* That any person who shall enter a vineyard, orchard, or garden, during the months of July, August, September, or October, without the consent of the owner, and pick, take, carry away, destroy, or injure any of the fruits, vegetables, or crops therein, on in anywise injure or destroy any bush, tree, vine, or plant, shall be guilty of a misdemeanor, and on conviction thereof shall be punished by imprisonment in county jail, not more than ninety days, or by fine not less than five nor more than one hundred dollars, or by both such fine and imprisonment in the discretion of the court.

Sec. 2. That act number 131 of the public acts of 1869, entitled "An act to protect vineyards in the State of Michigan," being section 9195 of Howell's annotated statutes of Michigan, be and the same is hereby repealed.

MARKING FRUIT PACKAGES.

AN ACT to provide for marking on packages, designed for the shipment of certain specified kinds of fruit, the number of pounds which each of said packages shall contain.

Section 1. *The People of the State of Michigan enact,* That all manufacturers of peach baskets and other fruit packages designed for the shipment of peaches, grapes, and plums, and all shippers and dealers in the same, shall mark or cause to be marked, in a plain manner, on the outside, otherwise than the bottom, of such baskets or packages, the capacity of each basket or package in pounds at the rate of one pound for each 43.008 cubic inches of space contained in such basket or package.

Sec. 2. Any manufacturer of or dealer in peach baskets or other fruit packages designed for the shipment of peaches, grapes, and plums, who shall sell or offer to sell such baskets or packages without complying with the provisions of this act, shall be deemed guilty of misdemeanor, and upon conviction thereof in any court of competent jurisdiction, shall be fined not less than twenty five dollars nor more than one hundred dollars, and stand committed to the county jail until such fine and costs are paid.

Sec. 3. All acts or parts of acts contravening the provisions of this act are hereby repealed.

HORTICULTURAL SOCIETIES.

ANNUAL MEMBERS OF THE

MICHIGAN STATE HORTICULTURAL SOCIETY

FOR 1898.

Edwy C. Reid	Allegan
John Keating	Muskegon
R. Morrill	Benton Harbor
S. B. Smith	Grand Rapids
I. H. Butterfield	Agricultural College
R. H. Sherwood	Watervliet
George Shackleton	Grand Rapids
M. B. Williams	Douglas
E. A. Moseley	Grand Rapids
O. L. Brown	Bellevue
J. G. Hancock	Grand Haven
I. J. Bear	West Carlisle
C. F. Hale	Shelby
D. W. Wiley	Douglas
F. O. Rouse	Shelby
H. D. Plumb	Mill Creek
R. M. Kellogg	Three Rivers
Robert Vahue	Allegan
L. B. Rice	Port Huron
H. H. Hayes	Talmadge
A. P. Green	Eaton Rapids
W. S. Gebhart	Hart
R. B. Strouts	Millburg
L. R. Taft	Agricultural College
R. D. Graham	Grand Rapids
J. W. Bedford	Cushing
W. S. Moffit	Rockford
G. G. Armitage	Three Rivers
Thomas Gunson	Agricultural College
L. J. Post	Lowell
J. F. Whitmeyer	Ionia
C. B. Welch	Douglas
C. W. Shriver	Benton Harbor
W. H. Miller	Berrien Springs
J. A. Pearce	Grand Rapids
J. J. Harrison	Painesville, O.
Frank Marsh	Grand Rapids
C. F. Hale	Shelby
J. C. Harwood	Pentwater
Geo. E. Fisher	Freeman, Ont.
Greening Bros.,	Monroe
A. Hamilton	Bangor
George S. Meech	Grand Rapids
C. A. Bloomer	Lisbon
E. P. Wilder	Grand Rapids
L. J. Wheeler	Plainwell
Thompson and Lake	Grand Rapids
H. O. Braman	“ “
S. J. Knapp	“ “
G. L. Dickerson	Palo
W. K. Munson	Grand Rapids
Perry Weed	Douglas
U. S. Smith	Allegan
E. C. Phillips	Grand Rapids
A. W. Mason	Palo
E. L. Bennett	Lowell
Henry Smith	Grand Rapids
Edward Hawley	Fennville
B. M. O'Brien	Grand Rapids
H. D. Perkins	“ “
F. J. Russell	Hart
Elmer F. Lewis	Grand Rapids
Thomas Beal	Brooklyn
M. W. Willard	Kinsey
W. A. Taylor	Washington, D. C.
W. W. Collier	Detroit
W. L. Farnum	Flint
A. I. Loop	Northeast, Pa.
A. W. Furness	Furnessville, Ind.
John Garmory	Rockford, Ill.
D. R. Waters	Spring Lake
Martin Walsh	“ “
Frank M. Deremo	“ “
Mrs. A. C. Douglas	Houghton
Alvin E. Hathaway	Orangeville
Henry Oldfield	Port Sanilac

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Vice-President—J. J. Parshall..“ “
Treasurer—John Allmand..“ “

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T. J. Fuller	" "
Jacob Ganzhorn	" "

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Joseph Whitlark	" "	E. A. Scott	" "
L. Granner	" "	Jake Schaffer	" "
Ed. Sumner	" "	Henry Purfield	" "
Herman Markman	" "	J. F. Beal	" "
C. G. Orcutt	" "		

Postoffice address of all, Ann Arbor, Mich.

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Vice-President—A. Haven	Bloomingdale
Secretary—C. H. Merrifield	"
Treasurer—Pliny Wait	"

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Wm. Zimmer	"	James Strong	"
J. G. Lockard	"	Edwin Remington	"
R. Powers	"	Bruce Crystal	"
C. F. Joy	"	G. D. Scofield	"
W. B. Miller	Kendall	George Wilson	"
H. H. Cosby	"	C. S. Adams	"
Lewis Waber	"	Charles Remington	"
Charles Everson	"	Simon Hazet	"
Byron Day	"	D. Button	"
W. S. Crosby	Gobleville	R. E. Allen	Glendale
Eugene Eaton	"	George Rich	"
F. M. Worthing	"	W. W. Scott	"
H. A. Holmes	"	B. F. Ferguson	Bloomingdale
O. C. Cackler	"	H. J. Prentice	"
J. B. Teft	"	Daniel Allen	Gobleville
S. B. Williamson	"		

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S. H. Shattuck	Covert
F. J. Overton	Bangor
Geo. C. Monroe	“
J. J. Champion	Toquin
S. McConnohie	“
H. B. Tyler	Covert
H. M. McLeod	Covert
C. O. Frazier	“
Thomas Daygent	“
Chester Carpenter	“
John Spelman	“
Israel Hill	“
Allen Pompey	“
F. B. Harris	“

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Vice-President—Wm. Rowe	“ “
Secretary—Roy Munson	“ “
Treasurer—E. Chase Phillips	“ “

MEMBERS.

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Chas. Alfred	Tallmadge
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